The Dental Digest.

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Original Contributions.

SUGGESTIONS ON DEVELOPING AND CONDUCTING A DENTAL PRACTICE ON BUSINESS PRINCIPLES.

By J. N. Crouse, D. D. S., Chicago.

[*Continued from page 579, No. 10, Vol. I.*]

In our last article we made the statement that poor teeth, as well as their destruction by caries, were due to imperfect nutrition and too great mental exertion. However, we did not intend to imply that they comprised all the causes, as we are well aware that the questions concerning the causes of trouble in the mouth, and the many forms of disease, are still in dispute, and we do not intend discussing them in detail in this paper. Nevertheless, intelligent patients are always desirous of knowing the causes and more especially how to prevent as far as possible the diseases to which their teeth are almost universally subject. Therefore, every dentist who expects to serve an intelligent community should be well informed on the established theories concerning the decay of the teeth, so that he can impart such information to his patrons as will lessen and prevent to some extent the trouble.

To begin with, wholesome food and pure air are bound to produce better physical organizations than poor food and bad air; and a strong physique and good digestion will beget better teeth and less dental disorder than a weak, dyspeptic system. Let us see then what is the best food to make children healthy and have good teeth. The diet should be varied and should contain foods which require thorough mastication.

Hot and doughy breads should be avoided, and bread raised with yeast should be more thoroughly baked than is the general

rule, and should be at least one day old when eaten. Cake, pastry and condiments of various kinds should be forbidden for several reasons. They occupy space in the stomach to the exclusion of more nutritious food; they upset the digestion; and they, while very palatable, so deprave the taste that substantial food is not craved and therefore not eaten. Children eat more sweets, candy, cake, etc., than their parents have any idea of.

Another bad custom is the excessive use of oatmeal. We are aware that in this view we will be opposed, as the article is much used as a breakfast food, very often as the chief dish, and with cream and sugar it makes a very palatable meal, but from an extensive observation of its action on children's teeth we are forced to the belief that it is one of the most objectionable foods that can be given to a growing child. We have never seen such a poor quality of teeth as in children who have been allowed an excessive use of oatmeal with cream and sugar. In large families where some of the children ate oatmeal and the others did not, the difference in the quality of their teeth caused us to look for causes, and the conclusion as stated was forced upon us.

The vegetables, especially in large cities, are often brought from such a distance as to make them unfit for food. Good potatoes are about the hardest thing to get, and it is very difficult to pass judgment until they are cooked, or even eaten. They should be grown in a sandy or light soil, not a wet or heavy one, and above all should be ripe, when they form a very digestible article of diet.

This subject of food is so extensive that we can touch only on a few points which we think are most important, leaving much which we would like to discuss. The next abuse must be treated of briefly, and that is the crowding of children in their studies. This applies more to families in cities, where the child is robbed of his childhood, especially an intellectual or delicate subject who should not be confined very closely. We have often plead, but to no avail, with the parents of nervous and delicate children, for the sake of their teeth, as well as their bodies, to take them out of school and send them into the country, where they could recuperate and be freed from the nervous strain and foul air of the school-room.

We will take up care and preventive treatment in our next article. [TO BE CONTINUED.]

PYORRHEA ALVEOLARIS.

By P. T. Smith, D. D. S., Denver, Col.

The abstrusity of conditions in an atomic aggregation of organic elements wherein automatism is exhibited, too often transcends the finite comprehension of the most intuitively endowed and erudite pedagogue or scholar, and we are left to grope about in darkness and danger in considering local or apparent pathological manifestations, whose origin occurs in such remote and seeming incongruous ways that the alert diagnotician is astonished at the great remove the object of his direct comprehension bears to the initiatory derangement, and whose insidious progress leads on to vital abnegation or transmutation, beyond which vicarious intermediation will not retrieve.

Under the above caption of life's functional adversion we are invited to contemplate, to a limited extent, the prevalent expression of vital degeneracy noticeable about the cirvo-gingival margins, and go back with the author to a remote inceptive principle of life to find the original seed of this membranous enemy.

Every organ, membrane tissue, or substance of an organic identity, has its peculiar class of cells which perform specific functional service in the development and maintenance of each kind or character of organ recognizable in the aggregated body. These cells derive and maintain their elemental aud functional differentiation from their immaterial and material composition, derived originally from the aids of parental promptings, and subject to subsequent influence of environment capable of changing their composition, so that at all times and ultimately their behavior is controlled by influences of composition.

Successful construction and perpetuity of any organic structure depend upon harmonious association of formative substances in cell individuality. This condition can only be exhibited by the necessary supply of proximate elements within the zone of their vital attraction. The latitude of cell action displayed in the result of their construction shows imperfection in proportion to the incongruous accretions they are forced to carry forward to their terminal destiny, and the unenduring result of the finish. Each anatomical division represents distinctive original characteristics, some with more attenuated histological construction, requiring a correspondingly delicate vital current of the purest

composition to sustain up to the functional standard of physical welfare of the parts considered. Others supplied by the same blood stream require and obtain elements of entirely different chemico-vital composition.

The cells upon whose formation devolves the evolution of the teeth, pericemental membrane, the nerve tissue supplying these parts requires full, steady, uninterrupted volume of nourishing vital current for a continuous and physiological result. The more intricate the construction of any anatomical or histological part, the more pure and contributive must be the flow of the vital nourishment to the objective tissue. Abnormal functional intervention with the best defined power and action of this life or nourishing current will stultify, deplete and starve any organ situated along the line or beyond the point of diminished or changed supply, or at any point of functional culmination, if any pathological interference is exhibited the dependent tissue must atrophy.

The organs most difficult of production are the most difficult to sustain in health, and of course the easiest to dethrone or swerve from their divine course or position. The lung tissue is likely the most common of any to display pathological intervention, being exposed perhaps to a larger range of negative influence. The hepatic and renal regions are similarly susceptible to deteriorating encroachments; correlatively are also the nasal and cranal mucus-lined sinus pericemental membranes and gingivæ, the latter being more easily weakened, owing to its complicated texture and service, as well as its situation at the vital terminus.

Some of the more active causes of vital interruption to the tissues mentioned are faulty nutrition, due to improper food, water and air; too much nitrogenous and oleaginous food; not enough organic phosphoric nourishment; too little or irregular sunlight exercise; too much mental strain and worry; too much continued exhaustion, and not enough systematic rest. Dietetic regularity and harmonious adaption are absolutely necessary to the surest continuation of organic economy; nothing but organic elements can be appropriated to the use and benefit of the ultimate organic upbuilding and perpetuity; primates cannot be correlated to the use and benefit of ultimate organic existence. Indigestible substances weaken and thwart the purposes of the

life currents. Mineral waters, of whatever kind, are contra-indicated in every instance, serving to clog and enervate cell action and composition. All fermented foods or drinks that have passed from the true organic form or natural atomic relations cannot be utilized by live organism. By the inordinate use of primate, mineral-bearing air, water and food, with too little proper fruit juices and vehicle-producing food, the organic elements of the body are encumbered, loaded down and overtaxed with elements that cannot be eliminated.

Alveolar Pyorrhea is simply a manifestation of overtaxed cells, where a clean, harmonious supply of adaptable nourishment should be exhibited, but instead the indigestible mineral substances or supply is overabundant, the canals for the home of nerve vessels and fluids are constricted, and the vital current is diminished until the co-operative cells find no room to work and local death gradually ensues, supplanted by pus formation, corrosion and absorption, as recognizable in the disease designating the character of this paper. The same causes operative in the establishment of pyorrhea develope liver and kidney troubles; they may or may not be co-existing. If either organ is stronger than the other, it is the last to be dethroned, if it is at all. Then the cause of this formidable derangement can be summed up in a description of bad living in the way of breathing bad air, drinking bad water, eating incongruous food of whatever kind, great mental strain, worry, excitement, irregularity, and lack of hygienic and physiological observations and adaptions in the regime of our lives.

GREEN HAIR.—Those who recall the experience of Timothy Tittlebat in his endeavors to get rid of his carroty locks, undoubtedly regard the report of green hair as somewhat of a fiction. As a matter of fact such colored hirsute adornment frequently appears among those employed in copper works and copper mines, and Bartholin drew attention to this fact as far back as 1654. Recently a case was reported to the Johns Hopkins Medical Society by Doctor Oppenheimer, as occurring in a man aged fifty-eight who had been exposed in copper works to very fine copper oxide for four years; he was rather uncleanly in habits, and was likewise "suffering from vague gastric symptoms." The hair was a "pale but distinct green," the color being more marked on the head and the beard, though, curiously enough, it pertained to the same growth throughout the surface of the body; the coloring, moreover, was uniform.—*Med. Age.*

CONSERVATIVE BRIDGE-BUILDING.

By Ira B. Archer, D. D. S., No. San Juan, Cal.

Modern bridge-work, when properly constructed, is one of the most artistic and useful, as well as comfortable, substitutes made by the profession. But do we always use common sense and do justice to the patient in selecting the proper appliance for every case? "The highest art is to conceal art." How many follow this precept in manipulation?

It is my candid belief that it requires more skill to turn out a good plate than a bridge. There is nothing hard about bridge-building; use common sense and close workmanship, paying strict attention to contour and occlusion; make your artificial piece conform to the natural organs—utility first, beauty last.

The higher class of patients object to being made like unto the golden calf, or to having sound teeth mutilated. They demand cleanliness, and as the best made appliance is subject to breakage, we should construct it with due regard to painless and easy repair. This I think I have found in the combination of two old methods, and it is as follows:

I will give a practical case. Patient, a hotel-keeper, presented with two left bicuspids of superior maxillary missing. He objected to any mutilation of cuspid. I crowned sixth year molar and soldered slot, about one-eighth by one-sixteenth inch, on anterior surface for retention of removable saddle bridge. Both crown and slot were strong and were made from 32 gauge platina gold plate. Took impression of alveolar ridge and made die and counter of Melotte's metal, and swaged saddle of platina gold plate 35 gauge. Swaged cusps of platina plate 35 gauge of occluding teeth by taking plaster impression of same, trimming, and taking impression of these plaster dies in Melotte's compound, then pouring Melotte's metal into this impression, which gives the only correct and practical form for all occluding surfaces in crown and bridge-work. Filled the platina cusps with solder, ground and adjusted two bicuspids, manufactured by the Protective Supply Co., waxed the palatine surface even with platina gold saddle and platina cusps, taking impression of same with Melotte's compound, making dies and swaging platina gold plate 35 gauge to cover entire palatine surface. Made retention

spring from two pieces of clasp metal. Soldered small spurs on the two pieces of plate and cusps for retention. Invested in plaster, removed the palatine plate and packed with rubber and vulcanized. No rubber showed when finished, except at mesial and distal surfaces; the palatine and alveolar surfaces showing gold; the buccal, porcelain; and the occluding, the platina cusps, which, not being so conspicuous as gold, have a better aspect.

The piece was so accurately constructed that it went to place without any grinding whatever, and was perfect in every respect, giving great satisfaction and comfort.

A THEORY OF WHOOPING COUGH.—Mr. Thomas Jackson writes to *The Lancet* as follows: He has always regarded the disease as primarily affecting the peripheral terminations of the trifacial nerves, and secondarily affecting the pneumogastric. We have a disease of childhood—mumps—which chiefly affects the parotid and sometimes also the submaxillary glands. Is it not likely that some microbe may have an affinity for the sublingual glands, and possibly also the submaxillary, specially affecting their epithelial or secreting structures, and causing to be poured into the mouth a quantity of vitiated saliva swarming with morbific products? The mouth, the fauces, and the stomach become immediately infected with the saliva, and irritation is set up in the terminal filaments of the fifth nerve. This nerve supplies the four glands just mentioned, as well as the papillæ at the base of the tongue and other sensitive parts that would be likely to become affected. The irritation passing up the nerve trunk would involve the other parts—the ophthalmic and superior maxillary. This would account for the redness and suffusion of the eyes and the nasal catarrh. The seat of origin in the brain of the trifacial and vagus nerves are closely approximate; so that it is not difficult to understand that an irritation might be communicated, and that the vagus stimulated in this manner, would set up all the secondary phenomena peculiar to whooping cough. It has been proven that the saliva of man will inoculate the rabbit, and yet no change appears to take place in the blood. There is no metastatic poisoning—in fact, if it were not for the "whoop" the whole train of symptoms could be easily explained as the product of poisoned saliva causing irritation and ulceration at the mouths of the ducts of the frænum linguæ—which is generally attributed to the forcible rubbing against the teeth during cough,—causing heat and pain in the mouth and fauces, producing cough, and causing indigestion and sickness, owing to the presence of starch and perverted secretion in the stomach. It is noted that the taking of food excites the cough; and, of course, the process of eating excites the gustatory, and mastication affects the buccal, nerves. He recommends swabbing the orifices of the salivary ducts after each fit of coughing with 5 per cent. solution of cocaine.

Digests.

The American Microscopical Journal for October, 1895.

"A METHOD OF HERMETICALLY SEALING CULTURES OF BACTERIA," by C. F. Dawson, M. D., Ass't. in Dep't. of Animal Pathology, U. S. Dep't. of Agriculture. The special features of the method are that the seal is perfectly hermetical and is easily and quickly applied; it is transparent, and can be removed without destroying the culture tube. By this method cultures can be easily preserved for a long time, probably for several years. Out of one hundred cultures only six became contaminated, and these probably had the contamination in the cotton plugs before the seal was applied.

The method is as follows: Flame the end of the culture tube, and with a pair of flamed scissors trim the cotton plug down even with the mouth of the tube. Flame a thick cover-glass of the same size as the mouth of the tube, and lay it on top of the cotton plug. Soak a piece of sheet gelatine for one-half minute in a solution of bichloride of mercury, 1-1000. Remove the gelatine and knead it between the fore-finger and thumb. The heat of the hand will make it sticky. The gelatine is then placed over the mouth of the tube, stretched a little by passing the nearly-closed left hand over the tube. The cover-glass is for the purpose of preventing bulging out or sinking in of the gelatine cover from changes of atmospheric pressure inside the tube. Now place a small rubber band round the gelatine-covered end of the tube close up under the flange. After two or three minutes, pass a sharp knife round the tube between the band and the flange. The gelatine and band thus cut away can be removed. The edge of the gelatine disc thus made must be pressed against the tube and outer surface of the flange, thus making a self-retaining cap. When dry, usually requiring half an hour, it is given a coat of shellac varnish in order to insure a perfect joint, and to prevent the gelatine from being broken. The varnish is applied by means of a camel-hair brush, and is made from the following formula: Absolute alcohol, 100 parts; white shellac, 45 parts; bals. copaiba, 4 parts. Allow this mixture to stand for a fortnight in a quiet

place, when an amber-colored supernatant liquid has formed. This should be carefully drawn off into a separate bottle having a paraffined cork stopper to prevent evaporation and adhesion of the stopper to the neck of the bottle.

The Journal of Medicine and Science.

"A PRACTICAL POINT IN THE USE OF DISINFECTANTS AND ANTISEPTICS," by A. G. Young, M. D., Augusta, Me. In his paper, "On Disinfection," Koch says: "Yet it is probable that many disinfecting agents, which under ordinary circumstances are inefficient, may become sufficiently active when combined with moderately increased temperatures; possibly also some such substances which have no disinfecting action at all at temperatures about 68° F., as the example of carbon bisulphide teaches, may be used with excellent results at somewhat higher temperatures. Experiments should be made along this line, as the working qualities of only a very few disinfectants are known, and these have been shown to be practically useful only under certain conditions."

Prof. Scalji, of Rome, has shown: Normal urine, when maintained at a temperature of 113°F. undergoes fermentation as readily as when left at from 59° to 77° F. If 5 centigrams of corrosive sublimate are added to one litre of urine, making a solution of 1-20,000, the urine putrefies at the end of several days if left at ordinary temperature; but is preserved a month without a trace of fermentation if kept at 104° F., and the antiseptic action is assured with a dose of only 1-100,000 of the sublimate. Furthermore, when urine which contains 1-100,000 of sublimate is kept at the temperature of 104° F. several days, and then allowed to remain at 58°-68° F., no trace of fermentation appears.

Behring refers to the confirmed fact that a 5 per cent. solution of carbolic acid at ordinary room temperature will not, even after many days, destroy anthrax spores with certainty, but when the temperature of the solution is raised to 99.5° F., their destruction is complete in three hours. Caustic solutions of the alkalies are more or less germicidal according to their strength, but he learned that the alkaline carbonates may become very energetic disinfectants when used at higher than ordinary temperatures. After working with strong solutions of carbonate of soda and of alkaline

soaps, and finding that they, at 158° and 176° F., were rapidly effective, he made a solution of washing-soda about as used in laundries and containing about 1.4 per cent. soda. This solution at 166°-181.4°F. destroyed anthrax spores in ten minutes, and at 167° F. in twenty minutes. These results surprised him, as he had assured himself of the high powers of resistance possessed by his anthrax spores.

Heider has probably marked out more fully than anyone else the influence which moderately increased temperature has upon the action of disinfecting solutions. We may note the following results, in which anthrax spores served as a test, and the time required to sterilize them is given: Carbolic acid, 5 per cent. solution, at ordinary room temperature, not destroyed from thirty to forty days; at 104° F., four hours; at 131° F., from three-fourths to two hours; at 167° F., from three to fifteen minutes.—Pure carbolic and sulphuric acid, equal parts of each by weight, 5 per cent. solution, at 104° F., in two hours; at 131° F., in thirty minutes; at 167° F., in one minute.—Pure cresol and sulphuric acid, equal parts of each, 5 per cent. solution, at 104° F., in one hour; at 131° F., in five minutes.—Lysol, 5 per cent., at 140° F., sterilization not effected in two hours; at 176°F., sterilization complete in five minutes.—Sulphuric acid, 1 per cent., at ordinary temperature, not sterilized in seven hours; at 167° F., sterilized in seventy minutes.—Caustic potash, 5 per cent. solution, at temperature of room, failed to sterilize in eight to ten hours; at 131° F., spores destroyed in three-fourths to two hours; at 167° F., in two to ten minutes.—Hot water, at 158° F., in eight to nine hours; at 185° F., in forty to forty-five minutes; at 203° F., in fifteen minutes.—Sporeless bacteria, of course, succumb much more readily to the germicidal powers of disinfectants. With stophyloccus pyogenes aureus as a test, sterilization was complete at the temperature of 140° F., with carbolic acid, 1 per cent., in five minutes; with carbolic acid and sulphuric acid, 1 per cent., in 1 minute; with caustic potash, 1 per cent., in three minutes; with lysol, ½ per cent., in three minutes.

Several explanations of these facts suggest themselves. One is the well known fact that the intensity of chemical action increases with increasing temperature; another is that moderately elevated temperatures favor the functional activity of bacterial

life and therefore the rapidity with which poisons are absorbed. But when we have to do with sporeless bacteria, and that is the case in nearly all of the real work of disinfection, we have the direct co-operation of moist heat in destroying their vitality, even when the increase in temperature is hardly more than moderate. Practical applications also readily occur. First, they suggest a grave doubt as to the efficacy of some processes of disinfection and antisepsis as they may be carried out during the cold season. Next, they teach the great advantage of using antiseptic and disinfecting solutions warm, or even hot.

Another advantage in using warm disinfecting solutions is shown by Nocht. In the use of the so-called 100 per cent. carbolic acid, its slight solubility in water is a hindrance. Mixed with water in the proportion of 5-100, much of it remains undissolved. If, however, the carbolic acid is added to a hot solution of soap and water, and the mixture stirred, a clear solution is formed. Three per cent. of soap and water at 140° F. will render 6 per cent. of carbolic acid soluble. The germicidal action of the solution is not increased by the presence of the soap, but heightened temperature makes it distinctly more effective. At 122° F. a 5 per cent. solution with soap destroyed anthrax spores in six hours.

The Southern Dental Journal and Luminary for October, 1895.

"CLEFT PALATES—CASES IN PRACTICE," by Dr. Benjamin Simons; read before the South Carolina State Dental Society, July, 1895. A lady of twenty-five presented with congenital cleft palate and very imperfect speech. About two years ago I put in one of Dr. Kingsley's soft rubber palates, the movements of which are dependent upon the motion of the remnants of the palate muscle. As she wore this one year with no improvement of speech, although she could get sufficient closure to blow out a candle, I determined to make her a hard rubber palate and try to educate the superior constrictor muscle. So I made a plate bridging the hard palate and attached it to the teeth with clasps, to which plate was attached at the heel two pieces of metal curving down to about a quarter of an inch of touching the superior constrictor muscle and about on a line with the lower border of the velum. I covered this with wax in ball shape, but the wax

would not conform to the shape properly, so I made a small ball of wax, covered it with soft modelling composition, and while warm replaced in mouth, then placed finger under ball to keep in position and made patient swallow, and repeated same several times, heating ball each time, until I got exactly the impress of the pharyngeal wall and remnants of palate muscles. Then took the impression and ran counter impressions of the piece in sections. Removed model and put in a layer of rubber, cutting a hole in bottom of first piece, then waxed up the balance, filling same with soft plaster, thus making a ball within a ball, then opened and packed it as regular case and vulcanized. Took plaster out of ball through hole cut in rubber as described, put in tin piece, covered with rubber and vulcanized. When finished found ball full of water, drilled hole and blew water out and filled with amalgam. Palate was very light and serves purpose tolerably well. Patient is improving in speech and has great comfort.

The Dental Record for October, 1895.

"THE MICROSCOPE IN DENTISTRY," by J. H. Mummery; read before the British Dental Association, August, 1895. A question of dental pathology which has a strong bearing upon daily practice—concerning the relative penetrative powers of coagulants and non-coagulants in the treatment of root-canals—has been much discussed in America. The view seems to be widely spread that when the pulp dies, the fibrils of Tomes and the sheaths of Neumann undergo decomposition, and that the products thereby formed, even after thorough removal of the pulp, result in discoloration of the entire tooth, and might, by septic examinations, act disastrously upon the pericementum. It does not appear that there is any sufficient evidence in favor of that view, and Dr. Miller has shown that the micro-organisms penetrate but a very little distance along the tubules from the pulp-canal in old, diseased roots, and that very frequently the root-canal in such cases is lined with a secondary deposit which would prevent such penetration, the openings of the tubules being cut off by that means from the pulp cavity. The discussion has been carried on, however, under the assumption that decomposition of the contents of the dentinal tubule actually does take place, and that in treating root-canals, not only the canal itself but the tubuli—and,

to be consistent, the lacunae of the cementum—must be treated. Drs. Harlan, Black, and others, consider that in the treatment of pulpless teeth for purposes of disinfection, coagulants are not only useless, but detrimental. I would mention, in this connection, that Miller long ago determined by experiment that the most powerful coagulants penetrated very rapidly. Dr. C. N. Peirce has lately attempted to show that certain forms of pyorrhea alveolaris are in their origin quite independent of micro-organisms, and are nothing more than the manifestation of a gouty diathesis. This opinion is based on the discovery that the dark brown or greenish deposits on the roots of teeth affected by pyorrhea are found on analysis to contain uric acid and its salts. The significance of this interesting discovery has been considerably diminished by the results of analyses published by Dr. Black, who finds the same urates in ordinary tartar when pyorrhea does not exist. This form of pyorrhea begins at the apex, or between the apex and neck, of the tooth, the gum in the early stages being firmly attached. Allowing this view of the origin of such cases to be true, we should not expect to find micro-organisms, but Dr. Miller has always found bacteria present in such deposits as are described by Dr. Peirce, so that in the present state of knowledge the etiology of even this form of this troublesome disease must be looked upon as not yet thoroughly established.

"Chloroform in Dental Surgery," by Dr. Frederick Hewitt, Anæsthetist to the London Hospital; read before the same society. As the chloroform fatalities have been so numerous in the last ten years, the safest anæsthetic should be employed for each particular case; nitrous-oxide for short operations; ether for long ones; and chloroform only when the state of the patient is such that ether cannot be given. The surroundings in dental operations, so far as chloroform is concerned, are not nearly so favorable as in ordinary surgical cases. The most convenient postures to the dentist are the very worst from the anæsthetist's point of view. In addition, there is a point of extreme importance, viz.: that as the operation of tooth-extraction under general anæsthetics often involves some asphyxial condition, either from posture, the presence of blood, the effects of the anæsthetic itself, or other causes, chloroform is contra-indicated, owing to the liability

of the circulation of a chloroformed patient to rapidly fail in the presence of any asphyxial state. This is not so with nitrous-oxide or ether.

Attention should be paid to the following points in the administration of chloroform for dental operations:—1. Seeing that there is a liability when chloroform is used for undetected embarrassment of breathing to arise, it is of paramount importance that the administrator should make *absolutely certain, from the commencement of the administration till consciousness is restored,* that air is entering and leaving the chest. Mechanical obstruction within the air-tract from numerous causes is very prone to arise, and unless the administrator actually hears or feels throughout the administration that breathing is proceeding, he will be very liable to be misled. 2. The administration should be conducted with the patient in the dorsal posture, the head and shoulders being so adjusted by pillows that the head is neither flexed nor extended. 3. Owing to the fact that breathing is liable to become interfered with by either extending or flexing the head upon the trunk (a point to which the author wishes to direct special attention), an attempt should be made to keep the head as far as possible in the longitudinal axis of the body. Should it become necessary to throw the head well back, this should be done when the patient is properly under the anæsthetic, care being taken whilst this extension is present that no blood or extracted teeth gravitate towards the now insensitive and open larynx. 4. Care should be taken during operations upon the lower jaw, or when employing a mouth-gag or prop, that the depression of the lower jaw does not interfere with breathing by causing the tongue to meet the pharyngeal wall. 5. Intercurrent asphyxia from the causes which are given is far more likely to arise during light than during deep anæsthesia, so that the administrator should be on the alert for it just as the patient is entering and leaving the latter state. 6. The patient should be placed deeply under chloroform before any operation is begun. Should any signs of recovery manifest themselves before the operation is completed, care should be taken in re-applying the chloroform; the patient's head should be turned to one side, a free air-way maintained by means of a gag, and from this point onwards only a moderately deep anæsthesia should be kept up. 7. Patients with naso-

pharyngeal adenoid growths, enlarged tonsils, or nasal polypi, should be anæsthetised with special care, owing to the greater tendency to become asphyxiated which such patients naturally display. 8. At the conclusion of the operation the patient should at once be turned upon his side, a gag being placed between his jaws till consciousness is restored. The side posture allows all blood to drain from the mouth and fauces, the tongue to gravitate towards the cheek, and, by reason of the free respiration thus established, chloroform to readily escape from the circulation.

The British Journal of Dental Science for October, 1895.

"ORAL SURGERY," by Edmund W. Roughton, B. S., M. D. (Lond.), F. R. C. S., Eng. Chronic Alveolar Abscess. There are two forms, the *fistulous* and the *blind*. The fistulous variety is nearly always the sequel of an acute abscess which has failed to heal, owing to the exciting cause remaining in action, but in some cases the inflammatory process may have been chronic from the first. The orifice of the fistula is usually situated at the spot where the original abscess burst, this being, as already stated, on the gum over the affected root; but the original opening may close and a second one form in some other situation, with or without an exacerbation of the inflammatory symptoms. This process may be many times repeated, so that eventually the discharging opening may be far removed from the original source of trouble. The direction followed by the pus is determined by the resistance of the tissues encountered and by gravitation; hence it happens that the opening is usually found below the source of the pus. In the case of the lower jaw, the pus may find its way to the surface near the lower border of the bone, or entering the cellular tissue of the neck it may travel downwards even as far as the clavicle. In the upper jaw the opening, when on the face, is most commonly found just below the prominence of the malar bone, in the centre of a rounded depressed scar fixed to the bone by a fibrous cord. Sometimes the pus may burrow in the direction of mucous surfaces other than the mouth; an abscess at the root of an upper incisor may sometimes discharge into the nose, leading to a mistaken diagnosis of ozaena being made. Abscesses at the roots of the upper molars, especially the first, may open into the antrum, producing an empyema of that cavity.

The blind variety of alveolar abscess has no external opening, and is simply a collection of pus in a bony cavity formed around the root of the affected tooth. A blind abscess may result from the closing of a fistulous opening, but, as already mentioned, the usual course is for the pus to find vent again either at the same or some other spot. In other cases the bacteria from the pulp chamber, being of but low pyogenic power, may have set up suppuration of such an extremely chronic kind that the resulting abscess has remained quiescent and has never sought an external opening.

Symptoms.—When the opening of a chronic fistulous alveolar abscess is immediately over the root of a carious tooth, the condition is at once recognized on inspection, but when the opening is remote the difficulty of diagnosis may be much greater. In such cases the employment of a fine probe may trace the sinus in the direction of a carious tooth, but sometimes the track is so narrow and devious that we do not gain much information by this means. In doubtful cases the condition of the teeth should always be carefully inquired into, and it should be borne in mind that the offending tooth is not necessarily a decayed one; a tooth pulp may die and lead to apical trouble, while the tooth still retains appearances of integrity which may deceive those not experienced in dental affections; again, the offending tooth may be "impacted," and therefore out of sight. Not unfrequently the sinus is kept open by the presence of a small sequestrum, and will not close until this has been removed.

Treatment.—The treatment of a chronic alveolar abscess consists in rendering the pulp cavity and apical space of the offending tooth aseptic. If this cannot be accomplished, or the prospective utility of the tooth does not warrant the attempt, extraction should be performed. When the case is complicated by necrosis, the sequestra should be removed as soon as they are loose. Even when necrosis has involved a considerable portion of the alveolar border, the loosened teeth may sometimes be saved by careful dental treatment, and the new bone thrown out from the periosteum will afford in time a firm socket. In cases of abscess discharging on the face, an attempt should be made to divert the discharge into the mouth. The depressed scar which is left by such an abscess may be much improved in appearance by dividing

the fibrous band which binds it down to the jaw by a fine tenotome entered from the mouth.

Necrosis of the Jaws. *Causes.*—The immediate cause is deprivation of blood supply. This may be brought about in different ways; it may be the direct result of injury, a portion of bone being broken off and completely severed from all vascular supply; but in the majority of cases necrosis results from inflammation of the bone or its periosteum, the circulation being arrested by the pressure of the inflammatory exudation. Inflammation leading to necrosis may be due to several different causes; it may have started in a neighboring tissue and have spread to the jaw (*e. g.* cancrum oris); it very often starts in connection with a decayed tooth; it may be the result of certain chemical substances, such as caustics, mercury, and phosphorus; it may be due to the presence in the blood of the specific poison of such diseases as smallpox and other exanthemata, acute necrosis (infective panosteitis), syphilis or struma; lastly, the cause of the inflammation may be undiscoverable, it is then spoken of as "idiopathic." The causes may be arranged thus:—1. Injury. 2. Spread of inflammation from—(a) dental disease; (b) cancrum oris, etc. 3. Chemical agents—(a) caustics; (b) mercury; (c) phosphorus. 4. Blood disorders—(a) exanthematous fevers; (b) infective panosteitis (acute necrosis); (c) syphilis; (d) struma. 5. Idiopathic.

Pathology.—The mandible is more liable to necrosis than the maxilla; this is owing to two causes: firstly, the mandible is largely composed of compact osseous tissue, and therefore inflammatory products are pent up under great tension and stasis of the circulation is very apt to result; secondly, the mandible is almost entirely dependent for its blood supply on the two mandibular arteries, which are deeply placed and almost isolated from collateral circulation, whereas the maxilla enjoys a rich blood supply from numerous vessels which anastomose freely. The process by which the bone perishes and becomes cast off as a sequestrum does not differ from that occurring in other bones, but the process of repair presents certain peculiarities deserving of notice. In the maxilla repair is remarkably feeble. As a general rule in adults there is no repair whatever; a gap remains and is not filled in. In a very few cases some formation of bone has been noticed, but

these are quite exceptional. In children the gap becomes filled up to a large extent by fibrous tissue, but no new bone is developed. In the mandible the process of repair is remarkable for the completeness with which it is often carried out, although a few cases of non-repair are on record. As soon as the acute inflammation has subsided, the periosteum begins to throw out new bone and encloses the sequestrum in a casing which is perforated by cloacæ through which pus escapes. When the sequestrum has escaped, or has been removed, the cavity thus left is rapidly filled in by granulation tissue which subsequently ossifies. In this way large portions of the jaw may be reproduced. The museum of St. Bartholomew's Hospital contains a remarkable specimen, showing how complete this reproduction may be. The patient, a lad of 18, from whom the specimen was obtained, suffered from phosphorus necrosis; six months before death the whole of the mandible was extracted; in a few weeks there was evidence of formation of new bone, and the process extended with such rapidity that at the time of the patient's death the whole bone with the exception of the alveolar process had been reproduced, the new mandible resembling that of an old edentulous person. Heath mentions a case in which he extracted several large sequestra, including the right condyle, and yet such perfect repair ensued that the movements of the jaw were as free as if the articulation had not been interfered with. In patients who survive it is found that the reproduced bone is not permanent, but slowly becomes absorbed, being reduced to a mere arch; this is probably an example of atrophy from disuse; the new member being edentulous, is not sufficiently exercised to preserve its nutrition. As a general rule the teeth belonging to the necrosed piece of bone are lost, but this does not always happen; sometimes the alveolar border escapes death and is still able to retain the teeth *in situ*.

Symptoms.—The symptoms of necrosis vary considerably in different cases, and will be described when dealing with the different varieties of necrosis. At present it will suffice to say that the symptoms may be grouped under three chief heads: (*a*) Those of the disease of which the necrosis is the result. (*b*) Those directly due to the presence of the sequestrum. (*c*) The constitutional effects.

Treatment.—The following indications are common to most cases of necrosis. (*a*) *Treatment of the Cause.*—When possible the cause should be removed before the evil effect is produced; thus in those who work in phosphorus, or mercury, precautions should be taken to prevent these substances from producing necrosis, and in suppurative affections of the jaws steps should be taken to prevent separation of the periosteum, by making timely incisions. (*b*) *Evacuation of Pus.*—Free incisions should be made (from within the mouth if possible) so as to provide free drainage; retained pus is apt to decompose, and to aggravate the local condition as well as the general health. (*c*) *Antisepsis.* The mouth must be kept as clean as possible, by the frequent use of mouth-washes or boracic acid; if the patient is unable to use a mouth-wash, the parts must be well syringed, or mopped over with absorbent cotton wool steeped in some suitable antiseptic, and then dusted with iodoform, or boracic acid powder. Cavities in the bone may be lightly packed with sal alembroth gauze soaked in glycerine emulsion of iodoform. (*d*) *Removal of Sequestra.* Sequestra should not be removed until they are loose, but if a projecting piece of dead bone is a source of much annoyance, a portion of it may be clipped off with bone forceps even though it is not yet detached. In cases of extensive necrosis the sequestrum should not be removed until the case of new bone has attained sufficient strength to preserve the outline of the parts. When the whole bone has necrosed it is necessary to divide it at the symphysis to extract the sequestrum. Incisions for the removal of sequestra should be made within the mouth when possible; when occasion necessitates their being made from without they should be planned so that they may leave as little deformity from scarring as possible. Some surgeons prefer to remove the dead bone at as early a period as possible without waiting for it to become detached, but the plan is not to be recommended. (*e*) *Constitutional Treatment.* The patient's food must be adapted to the condition of his mouth; as mastication is in most cases impossible, the diet must be restricted to fluid, or soft solid articles, such as milk, soups, essences, eggs and finely minced or pounded meat. When the sequestrum is large and prolonged suppuration occurs, the judicious use of stimulants coupled with the exhibition of quinine and iron is desirable. The swallowing

of pus is apt to derange the digestive system and necessitate the use of drugs to regulate the action of the bowels and improve the appetite.

Traumatic Necrosis. Necrosis has already been referred to as an occasional complication of fracture of the jaws. It may be brought about in two ways: (*a*) in a comminuted fracture a piece of bone may be separated from its vascular connections to such an extent that it dies; (*b*) suppuration may ensue and pus may burrow beneath the periosteum, and by separating it from the subjacent bone lead to the death of the latter. In this way much bone may be lost and great deformity and impairment of function may result. Necrosis should be suspected and looked for in any case of fracture which goes on suppurating and makes little or no attempt at union. The removal of the sequestrum will soon be followed by consolidation of the fracture. Necrosis of a piece of alveolus may follow the extraction of a tooth; this may be due to death of a small piece of bone which has been fractured during the operation, but is more often due to osteitis set up by the tooth before removal.

Necrosis of Dental Origin. Dental disorders may lead to necrosis in three ways: (a) Acute periodontitis may, without the formation of an abscess, extend to the alveolus, setting up osteitis of sufficient intensity to produce necrosis. Such necrosis may be limited to the socket of one tooth or may affect several; (b) an alveolar abscess may form in the manner already described and strip the periosteum from its bony attachment, instead of perforating that membrane and becoming evacuated. Thus extensive necrosis may result, especially in the lower jaw. In the upper jaw extensive lifting of periosteum may occur without producing necrosis, the bone being kept alive by the blood supply derived from its opposite aspect; (c) an abscess not infrequently forms around an impacted lower wisdom tooth, the pus burrows and strips up the periosteum, causing death of the underlying bone.

Necrosis Secondary to Ulceration of the Mouth. Necrosis may result from the invasion of the jaws in cases of cancrum oris, severe ulcerative stomatitis, or ulcerating malignant growths. In such cases the necrosis is of comparatively slight importance, the disease of which it is a complication being so formidable as to overshadow the lesser condition.

Necrosis from Caustics. A very powerful caustic may cause immediate death of bone by destroying it in the same way that a piece of wood would be charred by strong sulphuric acid; but when necrosis follows the use of caustic substances, such as arsenious acid, or chloride of zinc employed in dental practice, it usually results from the application exceeding the action it was intended to produce and setting up acute inflammation in the adjacent bone.

Mercurial Necrosis. This was a common affection in the days when syphilis was treated by large doses of mercury, and when the drug was not considered to have done what was required of it unless profuse salivation was produced. It was also common amongst men employed in the manufacture of mirrors when liquid mercury was used. At the present day mercury is much more sparingly used in the treatment of syphilis, and the method of silvering glass in the manufacture of mirrors has been improved, so as to diminish the risk that the workers are exposed to, consequently mercurial necrosis is now a rare condition, being practically only seen in patients who are peculiarly sensitive to the action of the drug. The effects of absorption of an injurious amount of mercury into the system are an unpleasant metallic taste and a general inflammatory condition of the mucous membrane of the mouth. The tongue becomes furred, tender, swollen and indented by the teeth. The gums become reddened at their margins, swollen and tender. The periodontal membrane becomes inflamed, the teeth loosened and raised from their sockets and tender when pressed on. The inflammation extends to the alveolar process, setting up osteitis which may be severe enough to terminate in necrosis. In some cases the osteitis and resulting necrosis is not limited to the alveolus, but may involve the whole thickness or even the whole extent of the jaw. In St. Bartholomew's Hospital museum there is a specimen of necrosis of the whole of the lower jaw which followed the administration of a few grains of calomel in a case of fever; it is possible that in this case the fever itself may have been a part cause of the necrosis. In cases of chronic mercurial poisoning the hands and arms become tremulous, the patient becomes cachectic, sallow, emaciated and weak. The most important point in the treatment of mercurialism is to remove the patient from the baneful influence of the

drug before serious harm has resulted. The elimination of mercury from the system may be hastened by the administration of iodide of potassium. The catarrhal condition of the mouth is best treated with frequent rinsing with a two per cent. solution of chlorate of potassium. Should necrosis ensue it should be treated on the principles already indicated.

Phosphorus Necrosis. This was unknown prior to the invention of lucifer matches; it was first recognized some ten years after the establishment of manufactories in London. The disease is caused by the inhalation of fumes emanating from phosphorus, consisting chiefly of phosphorus and phosphoric acids (H_3PO_3 and H_3 and PO_4). These fumes become dissolved in the saliva and act locally upon the alveolar periosteum, which they reach through carious teeth. In opposition to this statement, various writers have held the following three views, all of which are probably wrong:—(*a*) that the disease is caused by arsenic, which is sometimes admixed with the phosphorus, (*b*) that the phosphorus is absorbed into the system and reaches the jaws by the circulation instead of directly by the saliva, and (*c*) that it occurs in persons with sound teeth. The two jaws are about equally liable to the disease; if anything, the mandible is affected slightly more often than the maxilla. The disease usually does not show itself until the worker has been exposed to the fumes for a long time, probably never under a year. On the other hand, it may occur some months after the person has ceased to have anything to do with phosphorus. The early symptoms are those of periodontitis. There is toothache, at first intermittent, but afterwards continuous. The gums swell and become separated from the necks of the teeth, which are loose and tender on pressure. Pus wells up from the sockets. The tissues of the cheek are always much swollen; in some cases when the inflammatory symptoms are at their height, the swelling may involve the whole side of the head and face and even the neck. In most cases openings form upon the face as well as inside the mouth, and from them pours a copious discharge of sanious offensive pus. The constitutional symptoms are severe and are due to septic absorption, to the ingestion of decomposing pus, to inability to take food, and to the severe pain which is endured. Death may occur at an early period, when the inflammatory condition is at its height, or the patient may survive

this stage to perish later from exhaustion, due to long continued hectic and suppuration. In some cases recovery with extensive scarring and deformity ensues. No repair occurs in the maxilla, but in the mandible the new bone formed by the periosteum closely resembles pumice stone, and adheres firmly to the sequestrum, some of it usually coming away when the latter is removed. Microscopically this pumice-like deposit presents the following peculiarities:—The Haversian canals are very large, and are at right angles to the bone, instead of parallel to it; they interlace and end with open mouths on the surface; the deposit is laminated in structure, and its matrix is brittle and powdery. This curious formation is almost peculiar to cases of phosphorus disease, but has occasionally been met with in necrosis due to other causes. The most important point in the treatment of phosphorus disease is prevention. Amorphous phosphorus is innocuous, and should always be employed instead of the injurious variety. Persons who are compelled to work with ordinary phosphorus should observe scrupulous cleanliness and should work in well-ventilated rooms. They should take great care of their teeth, and should have any carious spots carefully filled. No persons with carious teeth should be exposed to the fumes of phosphorus. Should the disease occur, the person affected should be at once removed to healthy surroundings and any suspicious teeth extracted; any swelling of the gum should be very freely incised. When necrosis has actually occurred, treatment must be conducted on the general principles already described.

Exanthematous Necrosis. Necrosis of the jaws is one of the numerous sequellae which may occur during convalescence from the eruptive fevers. It is commonest after scarlet fever, but occurs also after measles, small-pox, and typhoid. It is most often met with in children of about five, an age at which developmental changes in the teeth are actively proceeding. The necrosis does not commence until some weeks have elapsed since the subsidence of the fever, and the extent of the necrosis bears no relation to the severity of the original disease; very often the patient seems in good health.

Symptoms. The onset of the disease is insidious; there are no active inflammatory symptoms and pain is usually slight or absent; foetid breath is about the first symptom that directs attention to

the mouth. On inspection it is then seen that the gum is red and tumid and more or less stripped up, leaving the subjacent alveolus bare, and that from beneath the gum foetid pus exudes. As a rule the necrosis is limited to the alveolus and is symmetrical, that is to say it affects the same parts on both sides of the jaw either simultaneously or in rapid succession; but this is not always so.

"Acute Necrosis" (Infective Panosteitis). This disease, which is probably the effect of a specific micro-organism in the blood, is most commonly seen in the tibia, but sometimes affects the jaws. It has been described by Senftleben under the name of "acute rheumatic periostitis." It may occur in healthy persons with sound teeth after exposure to cold. It is accompanied by violent pain, great swelling of the affected part and intense fever. The most important point in the treatment is to make free incisions into the swollen part whether suppuration has occurred or not.

Syphilitic Necrosis. Affections of bones in secondary syphilis are usually slight and transitory, but in the tertiary stage inflammation of bone and periosteum is apt to produce necrosis. The lower jaw is but rarely affected. It is in the palatine process of the superior maxilla that syphilitic necrosis is often met with. In some cases the sequestrum does not involve the whole thickness of the bone, and no perforation of the palate results; in other cases a small perforation occurs, but closes again when the sequestrum has come away; in more severe cases a permanent perforation of the palate results, causing marked impairment of speech; occasionally a large sequestrum from the hard palate may be discharged through the nose without the muco-periosteum of the mouth being damaged.

Treatment. Iodide of potassium must be administered until the sequestrum has come away and all inflammatory trouble has ceased. With this drug, tonics such as quinine and cinchona may be advantageously combined. The mouth must be kept clean with antiseptic washes. Should a perforation of the palate occur, it should be covered over by a well-fitting obturator attached to the teeth; on no account should the opening be plugged, as the constant pressure thus exercised would enlarge the aperture by causing absorption of the surrounding bone. The museum of St. Bartholomew's Hospital contains a curious specimen illustrating

this point. It is the skull of an old woman who had lost the whole of her hard palate. She had filled in the gap with a bung of cork, around which was wound a quantity of tape to adapt the plug to the increasing size of the aperture. In some cases where the aperture is small and the general health good, the parts may be successfully restored by a plastic operation.

Strumous Necrosis. Strumous inflammation of the jaws is not common, but one sometimes sees cases of chronic osteitis and periosteitis of the jaws, usually the mandible, in young strumous subjects, in which extensive caries and necrosis result. The treatment consists in improving the general health by tonics, sea-air, etc., and in scraping away all the carious bone and diseased periosteum.

Idiopathic Necrosis. One sometimes meets with cases of necrosis of the jaws to which it is impossible to assign a cause. Their treatment must be conducted on general principles.

Empyema of the Maxillary Antrum. This disease may result from blows on the face, with or without fracture of the maxilla, operations involving the antrum, the presence of foreign bodies in the cavity, and the occurrence of necrosis of its bony wall; but in the great majority of cases empyema is secondary either to *nasal* or *dental* disease. Authorities differ as to the relative frequency of these two chief causes; dental surgeons see more cases arising from dental than from nasal diseases, but with specalists in diseases of the throat and nose this experience seems to be reversed. With regard to the causal connection between antral and nasal disease our knowledge is not at present very definite. It is well known that the mucous lining of the antrum is anatomically continuous with that of the nose and that therefore inflammatory affections starting in the latter may spread by continuity to the former. It is probable that acute nasal catarrh may spread to and involve the antrum, but our present means of diagnosis do not enable us to recognize an inflammatory condition of the antrum which has not gone beyond the catarrhal stage. Chronic hypertrophic conditions of the nasal mucous membrane, especially in the region of the middle meatus, are often found to be associated with similar conditions of the antral lining, and so-called mucous polypi, which are now regarded by most authorities as being of inflammatory origin, are not infrequently found

coexisting in the middle meatus and in the antrum. In some cases nasal polypi seem to be the result of the irritation produced by pus flowing from the antrum, and in others, according to some, antral trouble is secondary to and dependent upon the presence of polypi in the region of the ostium maxillare. With regard to the dental causes of empyema antri our knowledge is more definite. We know that the roots of the first and second molar teeth often form prominences in the floor of the antrum and are only separated from the mucous lining by a very thin plate or bone; in the case of the first molar even this thin bony covering is sometimes absent, so that an abscess occurring at the apex of one of the roots would open into the antrum more readily than elsewhere. Sometimes an alveolar abscess in connection with a canine or incisor tooth may open into the antrum, although the roots of these teeth are not usually in relation with this cavity. Clinically, cases of empyema antri may be subdivided into two classes which differ greatly in the symptoms manifested. In the first variety the ostium maxillare is patent, and the patient's complaint is of a discharge from the nose; in the second variety the ostium is blocked, and the complaint is swelling of the face.

Empyema with Patent Ostium Maxillare. The discharge from the nose is nearly always from one side only, but sometimes both antra are affected and the discharge is bilateral. It is intermittent, coming away when the patient's head is placed in any position which puts the ostium maxillare below the level of the fluid in the antrum, thus in the recumbent position, especially when lying on the side opposite to the affected antrum, the pus trickles down the throat and is swallowed or expectorated; in the erect position pus flows from the nostril on inclining the head forwards and towards the healthy side. It is often stated as a diagnostic point that if pus appear in the middle meatus, after the cleansing of the nose, on the patient going on his hands and knees and hanging his head down and inclined away from the affected side, the source of the discharge must be the antrum; but it must be remembered that the same phenomenon may be produced in cases of empyema of the frontal sinus. The discharge has an odor like that of bad fish; the smell is perceived by the patient but not by those around him. The constant swallowing of decomposing pus is very apt to upset the digestive functions

and may seriously impair the general health. Pain is usually absent or very slight. Swelling of the face does not occur except from some other cause.

The following methods of examination may be used to complete the diagnosis:—(*a*) *Catheterisation of the Ostium Maxillare.* It is possible to pass a hollow instrument into the antrum through the ostium and to draw off pus, but the method of examination has not been found to be of any practical value. (*b*) *Percussion* over the maxilla may yield a difference of resonance on the two sides, but the size of the air chamber is insufficient to give a percussion note of any real diagnostic value. (*c*) *Transillumination* is of considerable value. An electric lamp is introduced into the patient's mouth. The room must be quite dark. When the oral lamp is turned on, the cheeks and lower eyelids become illuminated; sometimes the pupils are illuminated and look dullish red instead of black, and the patient himself may perceive the light which reaches his eyes through the maxilla. In well-marked cases of unilateral empyema the transillumination is much greater on the healthy than on the diseased side, especially in the outer part of the infra-orbital region. Although very valuable, transillumination is not always conclusive, since the bones may not be symmetrical in thickness, or the antra in size, shape and partitioning. Sometimes both sides of the face remain opaque on transillumination; this may be due to the presence of an empyema on both sides or it may be due to universal opacity of the tissues or to insufficient illumination power in the lamp. (*d*) *Exploratory puncture* is the only certain means of diagnosing the presence of pus in the antrum. The puncture may be made through the empty socket of the first or second molar tooth, through the canine fossa, or through the inferior meatus of the nose. The exploratory puncture should be performed as aseptically as possible lest suppuration be set up in a previously healthy antrum.

Treatment. There is considerable divergence of opinion as to the best method of treating these cases. In a few cases due to dental decay the disease disappears spontaneously after removal of the offending tooth, but in the vast majority of cases it is necessary to drain the antrum and irrigate its cavity with antiseptic and astringent lotions. The following are the most common methods of treatment:—(1). *Opening through Alveolus.* This is

usually done after extracting a decayed molar tooth. An opening is made into the antrum through the apex of the alveolus with a dental engine drill. Sometimes after extraction it is found that the socket already opens into the antrum; it is then only necessary to enlarge the opening to a size sufficient to admit the drainage tube; this may be accomplished with a bur about 3-16 of an inch in diameter. The drainage tube should consist of a plain straight gold tube attached to a plate fitting the adjacent teeth. The lumen should be at least an eighth of an inch in diameter; many tubes are made so narrow that the smallest drop of pus occludes them; the upper end of the tube should just reach the antrum, and should not project into it or will not act as a drain until the pus has accumulated in the cavity sufficiently to reach the level of the extremity; the mouth of the tube should be provided with a plug which can be inserted by the patient at meal times so as to prevent the entrance of food. The tube having been satisfactorily adapted, the patient is prescribed a lotion consisting of ten grains of sulphate of zinc and ten grains of carbolic acid to the ounce of water; of this lotion one teaspoonful should be added to a tumbler of tepid water for each injection. The patient, seated before a mirror, injects until the fluid returns clean through the nose. The injection is performed twice daily, and then at longer intervals as the discharge diminishes. When the injection brings away no pus after a week's interval, the tube may be removed. In this way many cases may be cured, but the treatment must usually be carried on for five or six months. (2). *Opening through the Nose.* The natural opening into the meatus is much too high to be of any value for purposes of drainage or irrigation. It is therefore necessary to make an opening through the outer wall of the inferior meatus. The opening should be made by means of a trocar introduced through the outer wall of the meatus well behind the anterior extremity of the inferior turbinated body so as to avoid injuring the nasal duct. The cavity is then washed out with a suitable antiseptic or astringent lotion. In this method of treatment, the injection cannot be done by the patient himself. (3). *Opening through the Canine fossa.* The lip having been well retracted, an opening is made about half an inch above the margin of the alveolus and half an inch external to the prominence produced by the root of the canine tooth. If it is only desired to

wash out the cavity it will suffice to puncture with a trocar and canula. The opening may be kept patent by means of a small spiral spring tube attached to the teeth. If it is desired to explore the interior of the antrum, and curette the lining membrane, it is necessary to make an opening with a chisel or gouge large enough to admit the finger. In making such a large opening it is desirable to leave the disturbed portion of bone still attached by one aspect so that when the operation is concluded it may fall back in place like a valve. No bone should be completely removed.

It now remains to discuss the all-important question as to what method of treatment should be adopted in any given case, and here the great difficulty we have to contend with is that we are unable to discover the exact nature of the pathological changes which have taken place in the antrum; we do not know whether the mucous lining is simply inflamed and secreting pus, or whether it is greatly thickened and altered in structure, or whether polypi are present, or whether there is any necrosis of the bony wall, or whether the cavity is divided by septa to such an extent as to render drainage by a single opening impossible. These considerations, coupled with the tedious course that these cases often pursue under treatment, have led some surgeons to advise the making of a large canine fossa opening in every case; but other surgeons, recognizing the fact that many cases are cured by simple drainage and irrigation, object to the performance of the operation. For my own part, if there is a carious tooth present, I advise that it should be extracted, and the antrum drained and irrigated through the vacant socket in the manner already described. If the disease is not cured in six months, I advise the making of a large canine fossa opening, so that the nature of the antral disease can be discovered and dealt with effectually. In cases which refuse to get well with alveolar drainage properly carried out, it is usually found either that the mucous lining is much thickened and polypoid in nature, or else that the presence of septa has prevented the whole of the cavity from being drained. Diseased mucous membrane should be removed with a curette and obtrusive septa should be cut away. If the ostium maxillare should be found blocked, it is desirable to make an additional opening through the inferior meatus. After the operation the antrum should be filled with a long strip of gauze soaked in iodo-

form emulsion; after twenty-four hours the gauze is removed, and the cavity syringed twice daily until the discharge ceases; this usually occurs in a fortnight or three weeks. Some operators have found great difficulty in getting the opening to close, whilst others have complained of inability to keep the opening patent long enough to effect a cure; the tendency of the opening to close, or remain open, depends on the size of the original opening, and whether any bone has been removed or not. If care be taken to make the opening in the way described, it may be kept open as long as desired by the introduction of some form of plug, and will close spontaneously when allowed to do so. If there is no carious tooth present it is not justifiable to remove a sound one for purposes of alveolar drainage. In such a case drainage and irrigation should be effected through the nasal route if the patient can attend often enough, or through a small canine fossa opening if he must himself conduct the after-treatment. If there is any polypoid condition in the nose and no evidence of dental disease, it is advisable to proceed at once to exploration of the antrum by means of the large canine fossa opening.

Empyema with Blocked Ostium Maxillare. When the opening into the middle meatus is blocked the symptoms differ widely from those just described. There is no nasal discharge, but the pus increasing in quantity distends the antrum, producing a swelling on the face. The rapidity with which this distension occurs varies considerably in different cases. Sometimes the distension is rapid and is accompanied by symptoms of acute or subacute inflammation; there is pain at first of a dull deep-seated character, but soon becoming more acute and lancinating and attended with tenderness of the cheek and general febrile disturbance. Sometimes the distension takes place not only in the direction of the cheek but also towards the nose, obstructing respiration on the affected side, and towards the eye, displacing that organ and interfering with its function. In the acute or subacute varieties the empyema soon bursts either into the mouth, the nose or the orbit, in the latter case producing dangerous and sometimes fatal cellulitis. In the more chronic cases the distension extends chiefly in the direction of the face, producing a swelling indistinguishable from a cyst except by exploratory puncture. In such a case the important point in diagnois is to determine that

the antrum is distended by fluid and not by a new growth. It is often possible to obtain fluctuation and the so-called egg-shell crackling through the thinned-out bony wall, but no time should be lost in making an exploratory opening, the surgeon being prepared at the time to grapple with any morbid condition he may find.

Treatment.—The swelling must be freely opened where it bulges inside the mouth and the contents of the antrum dealt with according to the condition found. An opening should be made in the inferior meatus if the patency of the ostium cannot be readily re-established. Any carious tooth in connection with the antrum should be removed.

The Pacific Stomatological Gazette for October, 1895.

"DENTAL JURISPRUDENCE, INFECTION," by H. R. Wiley, A. B., San Francisco. There has not been much litigation on account of the infection of disease through the use of dental instruments. Supposing that the average number of thoughtless or careless individuals may be found among the members of the dental profession, it is but reasonable to presume that many serious cases of poisoning have been caused by the use of unclean instruments. Though this view of the matter may not be sustained by our courts, yet the annals of the profession establish it to a moral certainty. Dr. Rehfuss cites a number of cases in point, collected from the *Dental Mirror* and other sources. The majority of the cases referred to were of syphilitic poisoning, presumed to have been caused by slight abrasions produced by the slipping of the instruments during dental operations. Though each of these cases seemed traceable directly to the operations of the dentist, and no reasonable theory appeared by which to explain the inoculation, yet it is possible that in more than one case the dentist was unjustly blamed.

When we consider the fact, that it is held, upon good authority, that infection of such a disease may occur through the simple and evanescent agency of a kiss, or through contact of the inner surface of the lip with the poisoned surface of a drinking cup, we cannot fail to realize that serious difficulty must attend the efforts of the investigator who would arrive at any degree of certainty on the point under consideration. An appreciation of the diffi-

culty referred to undoubtedly has deterred some individuals from prosecuting suits for damages against dentists, through whose supposed criminal carelessness they believed themselves to have suffered. The danger of infection, through the medium of surgical instruments, is now fully understood by the intelligent practitioner, and has been ably met by the introduction of antiseptics. A thorough disinfection of surgical instruments both before and after an operation, is now recognized as an essential principle in surgery, and is applicable to its every branch. The general recognition of this principle by the profession involves an increase of responsibility on the part of the dentist, and therein lies its legal significance.

The law demands of the dentist that he shall, in all matters involving serious danger to his patient, reduce that danger to a minimum by the use of such means as are recognized and advocated by the authorities of his profession, or such other means as may be proven to be equivalent thereto. If the dentist does not possess reasonable knowledge of the proper means and methods to employ in a given case, he is chargeable with ignorance; if he possesses the knowledge of the means, but neglects to use them skillfully, he is chargeable with negligence, and under either condition is liable for any injury proven to be the direct result therefrom. The dentist's safe course lies in acquainting himself with the best means and methods in present use in his profession for preventing infection, and in the employment, uniformly, of those means and methods in his practice. In case of suit for damages for injuries alleged to have been caused by the use of unclean instruments, in the absence of absolute proof connecting the injury with the operation, the dentist will find a strong defense in being able to prove that he has followed the course above outlined.

"LONGEVITY," by F. H. Metcalf, D. D. S., Sacramento; read before the California State Dental Ass'n., July, 1895. People who live long, and retain their mental and bodily vigor, keep good hours and lead active lives. People rust out quicker than they wear out. Nutrition of the body can come only through the activity of the body. Food, no matter how nutritious, is not easily drawn into the system, or assimilated, unless muscular activity is going

on. Our lives, our dispositions and our mental capacity are regulated by what we eat, and there are few cases of ill-health that proper diet will not alleviate, but the trouble lies in the fact that it is cheap; the demand is for a cure that costs money. What a true saying: "Free prescriptions don't cure." How few people ever think or know of what elements the body is composed, and what food is required to maintain these according to climate, season, age, environment, etc.

The fourteen elements of the body are as follows: Oxygen, carbon, hydrogen, nitrogen, calcium, phosphorous, sulphur, sodium, chlorine and florine, iron, potassium, magnesium, silicum. There are seventeen combinations of the fourteen elements of food: Water, gelatine, fat, phosphate of lime, albumen, carbonate of lime, fibran, floride of calcium, phosphate of soda, phosphate of potash, phosphate of magnesia; chloride of sodium, sulphate of soda, carbonate of soda, sulphate of potash, peroxide of iron, silica. The processes of life in the body have the following divisions: First, the governing portion, the brain; second, the executive portion, the muscular system; third, the fuel, which, in a chemical sense, keeps up the supply of heat, which is the source of all activity and motion. Food must supply these three great divisions of the process of life in the proper proportion, or something will soon go wrong, though nature allows a wide margin. Of the fourteen elements needed in the body, and which must be supplied in the food taken to satisfy the great demands, vitality, strength and heat, I shall classify under the general terms, as follows (the words being used in their proper, and not chemical sense): The phosphates, in which phosphorous predominates, supply vitality or brain, nerves and bone; nitrates, in which nitrogen predominates, supply the muscles with strength; carbonates, in which carbon predominates, supply heat and make fat.

It is a lamentable fact that most people know nothing of the nature of the food they eat, yet wonder why they don't feel well. In most private houses, and particularly hotels, the *menu* does not vary with the seasons. Carbonates are as liable to predominate in hot weather as in cold. No profession offers better opportunities for spreading the truth than dentistry. The best brain foods, or phosphates, are lean meats, fish, cheese, crabs, wheat, barley, oatmeal, almond nuts, Southern corn, beans, peas, potatoes, figs

and prunes. The best carbonates, or heat-producers, are fat meat, sugar, butter, rice, rye, chocolate, dates, buckwheat, Northern corn, white flour; excess in this branch is the cause of poor health, poor blood and bad skin. The best of the nitrogenous foods, or muscle-makers, are vermicelli, eggs, cheese, meats, particularly beef, Southern corn, salmon, beans and peas. Phosphatic foods, for persons of strong mentality and for those who study much, cannot be too strongly urged. Coffee and tea are responsible for many nervous disorders. Many persons injure their stomachs by taking their food in too concentrated a form; they need more food for waste, fruit and vegetables, to distend the stomach, so that it may secrete the juices. Crabs and lobsters contain a great quantity of brain and muscle food, but are so concentrated that they should not be eaten within several hours of retiring. Hearty food should never be taken at night; it causes restlessness and twitching of the muscles. Oysters are easily borne by the most delicate stomachs. They are composed of 12.6 nitrates, 2 of phosphates, balance waste. To sum up: on cold days eat heaters and muscle-makers; hot days, vitalizers and wastes, fruits; tired days, muscle-makers and phosphates; headache days, vitalizers.

Zahnarztliche Rundschau for October, 1895.

"IMPROVED AMALGAM FILLINGS," by Dr. M. S. Mannhardt, Berlin, Germany. It is a well known fact that amalgam fillings do not prevent or arrest further decay. The convenience and ease with which they are prepared, as well as the enticing new brands which are constantly being placed on the market, with the invariable recommendation "that the amalgam is faultless and free from injurious effects," induce the great majority of practitioners to gladly and freely employ the article. Later they become aware that the old is fully as good as the new. However, we are compelled to resort to plastic fillings, as it is unreasonable to suppose that all patients can afford gold fillings, which are durable to a great extent.

The great difficulty with the amalgam filling is that the edge is not sufficiently strong and lasting, and that we have not as yet an ideal or non-shrinkable amalgam. The fissure which results from the shrinking or "globing" is sufficiently large to permit the

saliva and its accompaniments to enter, and secondary caries results in consequence. This objection to amalgam can however be overcome, and a perfect filling be inserted, if the operation is performed as I here suggest. I advise that subsequent to the preparation of the cavity the cavity-walls be lined with tin-foil, which must be pressed against them tightly, thus perfectly dressing them, then prepare the amalgam as usual and pack it in the cavity. But care must be taken that the tin-foil overlap the margins of the cavity, then after some days the superfluous tin-foil can be trimmed away and the filling with its tin-foil border will take a high polish.

In some classes of cavities, such as are somewhat anterior, you may employ platinized gold, such as is used in porcelain inlay fillings, as a lining for the cavity. One might use platinum alone, but I find that amalgam combines more readily with the former. When using the platinized gold it must be remembered that the overlap should be left undressed for some days. After some lapse of time you will be surprised at the perfect margins and the absolute absence of discoloration in a tooth thus filled.

Items of Interest for October, 1895.

"MECHANICAL DENTISTRY," by Dr. S. W. Foster, Decatur, Ala.; in Alabama Ass'n. The most essential point toward obtaining results in full dentures is to be able to select teeth of the corresponding color and shape. To do this we should be familiar with different temperaments. Of this most dentists know nothing, which results in unnatural appearances. Each of the four temperaments has facial expressions and teeth peculiar to its own type. Why is it we so often see pearl blue, long almond-shaped teeth inserted in the mouths of people whose lips are thick, eyes usually gray, face full, their general physical build bulky and clumsy—typical specimens of lymphatic temperament—while the above described teeth belong to the nervous type? Or, on the other hand, we often find the reverse, teeth that are dark gray, opaque, large and broad, inserted in mouths of persons whose lips are thin, eyes dark brown, hair dark and fine, general physical appearance delicate—true specimens of nervous temperament—while the teeth selected belong to the lymphatic type. It is because the dentist is ignorant as to what class of teeth are allied to the tem-

perament of the patient, or doubtless has no conception in his own mind as to what type of temperament the patient is. Some of our text-books tell us what class of teeth belong to each different temperament, two of which I have just described, as there seems to be here a lack of education. To the sanguine temperament, that most perfect type of humanity, belong teeth that have a straw yellow, translucent shade, and are well proportioned. And in the bilious temperament we have teeth of an opaque brownish yellow, large, broad, a little longer, however, than wide. It is true that we rarely ever find a person who has not a combination of two of the temperaments. If we are familiar with the different types we can so blend the two in making selections that we need make no mistake in finding teeth that will give the proper expression, should we observe the rules that govern setting up and adjusting them as we ought.

"CLASP PLATES," by John G. Harper, D. D. S., St. Louis. The first step in the operation of making a clasp plate is to obtain a model of the tooth to be clasped, which may be taken in modeling compound or wax; an impression may be taken with moldine and a metal model made. The model secured, the next step is to make a pattern for the clasp, using card-board for the purpose. The clasp should be wide, so as to clasp the tooth firmly. If you should wish to hold anything in the hand you would not clasp it simply with the thumb and finger, but with the thumb and all the fingers, and with both hands if the object to be held was large enough. The clasp should embrace the whole crown when permissible. The metal best suited for clasps is composed of a five-dollar gold piece, to which is added a ten-cent silver piece, and rolled to 24 of the gage plate; this clasp metal has the proper spring, and does not lose that property when heated in soldering, and can be soldered with 18k. solder when used on a gold plate. The paper pattern is used to cut out the proper shape of the metal, then the clasp is properly fitted to the model by commencing at one end of the clasp and carefully bending the metal, trying on the tooth, proceeding till the clasp fits the model, filing away the clasp so as to accommodate the festoons of the gums. The clasp is now ready to be tried on the tooth and further adjusted if necessary. If the clasp is for a rubber plate, a stay

should now be soldered on the lingual side of the clasp; these stays may be made of nickel by simply rolling "a nickel" to 28 of the gage plate. A piece of the nickel of the proper width and half an inch long is taken, some holes made in it and fitted to the clasp, by bending slightly to fit the clasp. Instead of placing the stay at right angle to clasp, attach it at about forty-five degrees, bending the nickel to fit the clasp instead of filing it to fit, this gives a firmer attachment.

The clasp is now ready to be smeared on the inside with a sticky wax, made of equal parts of beeswax and rosin, a little of the wax should be also placed on the stay to fill up the space between the stay and the palate or gum. The clasp is now placed on the tooth, any surplus wax removed, and see that the clasp is firmly set in its proper position. Select an impression cup; see that it does not touch the clasp or stay; take the impression in plaster; let it set firmly; remove by gently loosening and carrying it away from the teeth in the direction of the long axis of the teeth; usually the clasps come off in the impression; if not, they should be removed and properly set in the impression; remove the wax from the inside of the clasps, being careful not to disturb the wax on the stay, as this is a part of the impression. Prepare the plaster impression for the pouring of the model, allowing none of the parting material to cover the inside of the clasps. The plaster for the model is poured; allowed to harden; the impression removed, and you have a model of the mouth with the clasps held firmly in position, and are ready to go on and make the plate. Fourteen karat solder may be used for the rubber plate, as the solder is covered up in the vulcanite.

These clasps may be used on gold plates. The best results are obtained by first fitting the gold plate to the mouth, then placing the clasps in position as indicated in the foregoing. The plate may be held in position by the use of a little sticky-wax. The impression is taken with the plate and clasps in position. A model is now made of a mixture of plaster and marble-dust or sand; after removing the impression you have a model of the mouth with the plate and clasps in position; dry out and solder the clasps to the plate, using 18k. solder, only tacking the parts together, using but little solder, so that in case the clasps are not correctly adjusted they may be easily removed; the completion

of the soldering can be done at the time of soldering on the teeth. The plate with the clasps now attached is ready to try in the mouth; if all is correct, proceed to get the bite and attach the teeth in the manner preferred.

Ash & Sons' Quarterly Circular for September, 1895.

"TWO CASES OF TOTAL ANÆSTHESIA DURING INTENDED LOCAL ANÆSTHESIA WITH CHLORIDE OF ETHYL," by Hj. Carlson, D. D. S., of Gothenburg, trans. from *Correspondenz-Blatt fur Zahnarzte.* Patient, a young lady, eighteen years of age, presented for extraction of the first molar from the upper jaw. At her request I gave her a local chloride of ethyl injection, and the tooth was removed without difficulty. Immediately after the extraction I observed that the patient was entirely narcotised, but consciousness returned almost at once. To a question I put she explained that she had been narcotised before for tooth extraction, and for another operation, the first time with bromide of ethyl, and the second time with chloroform. But when she commenced to lose consciousness on this occasion she did not feel any asphyxial or respiratory difficulties, and this narcosis was considerably more pleasant than the earlier ones. That the patient experienced no pain—*i. e.*, did not feel the operation—is, of course, understood. After the bleeding had stopped, she remained with me for an hour without a trace of nausea, giddiness, or headache appearing; the next day also she felt completely well. The lady was of a bright temperament, of moderately strong constitution, and quite healthy. On the following day she came again to have a second tooth extracted, and requested that this should be carried out with local anæsthesia. It was done, but without the arrival of general anæsthesia.

The second case occurred with a boy from fourteen to fifteen years of age, under precisely the same circumstances; but it must here be noted that this patient was extremely anæmic.

The general anæsthesia in both these cases was, of course, caused by the patient inhaling the gas through the mouth. I certainly request every patient in whose case I employ this agent to breathe through the nose only, but it is easily comprehended that breathing through the mouth cannot entirely and always be avoided. From these two cases it will be seen that chloride of ethyl is not

absolutely without danger, but the great success achieved with it has induced me to employ it daily in my practice; when doing so I, of course, use every necessary precaution. I believe I minimise the danger as far as possible by means of napkins, which serve to keep the field of operation dry, and at the same time prevent the ingress of the gas. I have been told by colleagues that there are patients who consider the injection of the gas more painful than extraction without an anæsthetic agent; this is, however, probably due to the fact that in such cases the gas has been projected upon a tooth with an exposed pulp, which, of course, must be very painful. In such cases I cover the pulp with wax or cap the whole tooth with this substance. The patients then bear the injection very well. In order to still further prevent unpleasantness during injection, the gum may be painted with a solution of shellac in alcohol, or better still in ether, or recourse may be had to a subgingival weak cocaine injection.

Journal of the British Dental Association for October, 1895.

"NEWLAND-PEDLEY PORCELAIN CROWN," by M. F. Hopson, L. D. S. Eng. The method advocated is as follows:—The root canal having been sterilized and the apex sealed, a crown and pin are selected. Care must be taken to choose a crown which requires the least possible fitting; from the large selection available such a one can nearly always be found, and the trouble taken is amply repaid, both in the time subsequently saved and the original strength of the crown being maintained. It will be apparent that the crown is weakened in proportion to the amount of fitting required. Another point of no less importance is to see that the pin *fits* the hole in the crown which receives it. The face of the root is roughly cut down with a fenestrated root trimmer, and finished off with a carborundum wheel. When the root is free from caries on its lingual aspect, that portion is not cut down below the gum line, but left standing a little above it, a true self-cleansing joint in this position being so obtained. The root canal is next reamed out with tapered reamer to *fit* the pin, which for front teeth has a flattened oval in section. If necessary, the pin is bent to bring it into proper alignment with the hole in the crown. Having placed the pin temporarily in position, the crown is fitted down in a manner similar to that employed when letting

down an ordinary tube tooth. The coloring matter used at the demonstration to facilitate fitting was composed as follows:

Creta. prep .....4 dr.
Glycerine.....3 dr.
Carmine .....2 gr.
Ol. geranii.....3 min.

a preparation which met with the approval of the members who witnessed the demonstration. The pin is fixed first, and then the crown, one mixing of cement being sufficient.

In reply to many questions the demonstrator said that when the crown failed it was the crown which came away from the pin and not the pin from the root, and he attributed the failure to want of attention to the points mentioned above in selecting the crown. To obtain a good result a sound face to the root was a necessity. Where the bite was close he should prefer a Richmond crown, believing it a stronger one under such circumstances. The particular advantages claimed were, the ease and consequent quickness with which it could be adjusted, and the large selection that could be obtained at the depots. In his experience bicuspids went better than front teeth. It was not by any means a universal crown, but it certainly filled a place in crown work.

The International Dental Journal for October, 1895.

"FURTHER EXPERIENCE WITH BALSAMO DEL DESERTO," by Dr. W. H. White, Silver City, N. M. After another year of added experience in the use of this in dental operations, I say that I could hardly do without it. The record is still unbroken: I have never heard of a single case of recurrence of apical irritation after I have filled the roots with this material.

I believe the real secret of success with this material is,—1. That it is soft and permanently remains soft, and that it will adhere to a damp surface. A root-canal is like a tube, and is liable to change of calibre from thermal or other causes. When filled with a hard substance and such changes occur there must form a crack between the filling and canal-wall, or within the substance of the filling, thus allowing septic invasion; but when such a canal is filled with balsamo, the substance of the filling gives without cracking when there is a change of calibre, and when you add its permanent antiseptic and local antiphlogistic qualities,

and its entire compatibility with tissue of all kinds, there seems wanting nothing to be desired for these purposes. I have discarded the use of the barbed nerve-extractor in cases of recently destroyed pulps. I take out the bulbous portion with engine-burs, and clean the bulbous half of the root-canal with the Brewer drill, purposely leaving the dead nerve undisturbed in the apical half. After three years' experience I have not known a single case to cause trouble; the absolute immunity from all pain, soreness, neuralgia and abscess is certainly remarkable in the light of my former experience in such cases. My usual practice is to fill roots and crowns permanently at the second sitting, or, where I use local anæsthetics, taking out the pulp, I fill permanently, root and crown at first sitting.

I have a record of one hundred and thirty-eight abscesses cured during the past year. With these cases I have used nothing as a germicide except oil of cinnamon, and have filled all roots with the balsamo. In forty-eight of these cases the roots and, when amalgam was used, the crowns also, were permanently filled within thirty hours after treatment began. In seventy-one of these cases the roots were filled on the second or third day after treatment. Many of these latter might have been filled safely within twenty-four hours, but I either did not have time to attend to them or there was no necessity for haste. The only cases found that I did not feel safe in filling within forty-eight hours were those where the canal was so small that I had great difficulty in getting the germicide into the apical space, and those where the apex was necrosed.

I found three cases of abscess during the year that I could not cure,—they all occurred in the same mouth; they had fistulæ with apex necrosed, and a copious flow of thin, milk-white pus. I failed to cure a single abscess in this mouth by any method of treatment, even after amputating the necrosed pulp.

In none of the one hundred and thirty-eight cases treated and cured did I inject any medicament into the apical space, but allowed the cinnamon to reach that space by absorption. I made no attempt to remove the dead pulp from the apical third of the root canal. I dried the canal only so much as could be done with absorbent cotton. I used no escharotic to break up the pus-sac. I found blind abscesses far more amenable to treatment than

fistulous abscesses. It was immaterial to me whether the pus was discharged or not. Of course, where the pus discharged through the canal, I would allow all to escape that way that would, and when the abscess had made an opening through the process, I would lance the gum, but made no further attempt to get rid of the pus. The theory is that it is not the pus cells that hinder the healing process, nor is it the dead bodies of the microbes, but it is the ptomaines, the excretions of the microbes, that cause the trouble. Therefore, if you use a germicide it kills the microbes and stops the excretion of ptomaines; and let that germicide be one that does not poison human cells, but leaves them in healthy condition, so that they may perform their proper function; then the giant-cells, the scavengers of the body, will quickly devour the pus-cells and the dead bodies of the microbes, and the leucocytes, the builders of the body, will quickly repair the breach. Oil of cinnamon is too strong a drug to use full strength in the apical space. Leaving part of the dead nerve in the canal, so far from being a detriment, is an absolute benefit, as it allows only minute quantities of the drug to seep into the apical space. Dentists have been taught so long that it is necessary to evacuate the pus and to break up the pus-sac with escharotics, necessary to clean the canal thoroughly of dead pulp, and to dry the canal, etc., that it is difficult to make them believe that all these processes are not only useless but detrimental. I have used the material long enough to observe that the dead roots of temporary teeth filled with balsamo del deserto seem to be absorbed the same as live roots are. I believe the giant-cells will absorb a dead root as rapidly as a live root if there be no microbic ptomaines present to hinder them from performing their functions.

I have been particularly interested in watching the results of using balsamo with amalgam in filling teeth. In looking at the material one cannot realize its practical benefits. I have gradually grown into its use until I now use it in all amalgam fillings. Balsamo is so attenuant that a very small quantity of it will completely permeate the amalgam and perfectly insulate the several particles of metal, so that such a filling is as poor a conductor of heat, cold, and electricity as cement or gutta-percha. I now use it in all cases of nearly exposed pulp where capping of gutta-percha or of cement was formerly employed.

In recapitulating its good qualities I will say, first, it is more compatible with tooth-structure than any other filling-material yet devised. When a tooth is decayed so that the pericementum is exposed, mix the amalgam with balsamo, and place it lightly against this tissue, and it will remain perfectly comfortable. Any material which can be thus used must be compatible with tooth-structure. 2. I believe it hermetically seals a cavity, which cannot be said of any other filling-material now in use, there being a strata of balsamo next to the tooth that is soft and remains soft. 3. Fillings will require less undercutting than with amalgam alone; in fact, they adhere to the walls of the cavity as firmly as cement. 4. When balsamo is mixed with amalgam it causes the filling to be as poor a conductor of heat, cold, and electricity as a cement filling, and is impermeable to the fluids of the mouth. 5. The tooth-edge does not crumble as it does with amalgam alone. I think this is due to its entire compatibility. 6. The filling does not blacken the tooth as amalgam fillings do, balsamo keeping the filling from oxidizing. While it is thought these salts have a preserving effect, still they are not necessary when balsamo is used. 7. It is especially useful in filling temporary teeth where it is necessary to insert fillings quickly, and often without thorough preparation of the cavity. 8. Patients never complain of uneasiness or pain from thermal changes when sensitive teeth are filled with this material. In short, I believe this filling combines all the good qualities of amalgam, gutta-percha, and cement, and has a number of good qualities that none of these possesses.

When I wish to fill over-exposed pericementum, or where the pulp is nearly exposed, I mix balsamo with part of the amalgam and press it down lightly with spunk folded tightly in the pliers, finishing the filling with pure amalgam. For ordinary cavities I cover the cavity first with balsamo and work the amalgam into this; this forms a pasty mass; when the cavity is half-full I wipe off the surplus balsamo with spunk, firmly rubbing it against the walls of the cavity, then complete the filling with purer amalgam. When balsamo is mixed with amalgam it at first forms an unsightly mass, resembling blue mass in appearance, and shows dark through thin enamel, but after it has been in a tooth a few weeks or months it loses this dark color and the fillings look far better

than if amalgam alone were used. Spunk moistened with alcohol used on the amalgam makes a clean, hard surface to these fillings. The reason I think balsamo preferable to the various alcoholic or chloroform solutions of the gums now in use for lining cavities is that these solutions become hard on exposure to air and moisture. When lining a cavity, if the calibre of the cavity changes, these linings crack and thus allow the invasion of septic matter; balsamo will permanently retain its present consistency and cannot crack,—it is also more compatible with the tooth than these gum solutions. Among other things for which I find balsamo useful is, first, to relieve pain in the alveola after tooth-extraction, especially where no firm blood clot is formed. A plug of cotton saturated with balsamo put into the socket will keep it free from pain until thrown off by granulation.

2. When an exposed pulp is painful and congested, the pain is relieved and the circulation is restored to its normal condition by an application of balsamo. The relief from pain is caused by antiphlogistic properties and not by anæsthetic properties. I have thus often relieved the pain caused by arsenical application.

Until lately I thought balsamo a vegetable product, but I have discovered it to be an animal product; an insect uses this material to rear its young in the same way as bees use beeswax.

The Dental Review for October, 1895.

"A Method of Anchoring Large Contour Fillings in Incisors," by C. N. Johnson, L. D. S., D. D. S., Chicago; read before the First District Dental Society of Illinois, Sept. 11, 1895. The only reason for presuming to offer a paper on what might appear so small a subject is the fact that observation has seemed to show a serious lack on the part of many operators to recognize and apply the best principles in the anchorage of contour fillings in incisors. By contour fillings we mean cases where the proximate surface is so involved that the occlusal corner is gone, requiring a reproduction in filling material. Given a case where the pulp is dead and the anchorage is usually easily obtained, but where the corner is gone without much penetration of the decay toward the pulp, the result is a shallow cavity which seems to tax the average operator in his attempt to gain sufficient anchorage. From observation it would seem that the majority of operators prepare the

cavity in the following manner: After the usual conformation is given the cervical portion of the cavity, anchorage for the occlusal half of the filling is obtained by drilling obliquely into the cavity toward the occlusal surface between the two plates of enamel as they come together. Anchorage of this form frequently develops a weakness which results in a loosening of the filling as follows: The gold which is built into the occlusal undercut becomes slightly battered or compressed as the result of force exerted on the end of the filling, and the whole filling is thus allowed to tip away from the cavity, leaving a seam or space between the filling and tooth. In some cases a filling will remain partially dislodged in this manner for a considerable time without perceptible loosening, while in others the filling is forced bodily out of the cavity shortly after its insertion. It will readily be seen that any compression of the gold in the act of biting upon it will lift it away from its close adaptation to the occlusal undercut and result in a leakage of the filling—if not in a total dislodgment. So many cases of failure from this cause have been noted, and so many inquiries as to a surer method of anchoring these fillings firmly in place have recently been made of the essayist that he has been induced to prepare a short paper embodying his views on the subject.

Possibly a clearer idea of the method to be described may be gained by taking a typical cavity and outlining its preparation than by speaking in a general way of the process. Let us suppose we have a large mesial cavity on the left upper central incisor. There is little penetration of the decay toward the pulp, but the entire mesio-occlusal angle of the tooth is gone. This form of cavity apparently presents greater difficulties to the average operator than where the decay has penetrated deeper. In the present method of preparation the cervical half of the cavity is shaped in the usual way, being liberally extended cervico-labially and cervico-lingually. To obtain anchorage at the occlusal portion of the filling, instead of drilling into the axial wall in the ordinary manner, a groove is cut along the occlusal surface leading from the cavity distally to near the disto-occlusal angle. This groove must be made sufficiently wide and deep to admit of a large enough mass of gold being packed into it to insure strength, and in order to accomplish this in teeth with thin occlusal sur-

faces it is often necessary to cut away the lingual plate of enamel somewhat freely. This may be done with safety provided the enamel margins are properly beveled and gold built over them in the insertion of the filling. The distal end of the groove may be deepened somewhat to assist in retention. The philosophy of this form of anchorage consists in two things: First, it will prevent absolutely the tipping of the filling previously alluded to; and second, it increases materially the seating capacity of the filling. Since the appearance of Dr. Black's articles on the compressibility of filling materials and kindred studies, the seating area of our cavities becomes a matter of much importance, and it seems quite conclusively proved that, other things being equal, the larger the area upon which the filling rests to sustain it in the force of mastication the greater security it has against dislodgment. With the form of anchorage just outlined it becomes impossible for a filling to get out of a cavity short of a breakage, and if the mass of gold is made thick enough it will not break. It is readily seen that the greater the force brought to bear upon the filling in the closure of the teeth, the firmer it is driven into the cavity, and if there should be any compressibility of the filling material the tendency would be toward a closer adaptation to the cavity walls instead of a lifting away, as in the ordinary method of anchorage.

At first glance there might appear to be several objections to this method. Some operators may feel a hesitancy about drilling into sound tissue in this way for anchorage, but it must be remembered that in the preparation of any cavity sound tissue is often sacrificed for this purpose. In this instance I am convinced that it is sacrificed to good account, and I feel sure that when the operation has once been done in this manner the operator will to a large degree find his hesitancy gone. There is a feeling of security when the gold has been built well over and anchored into the occlusal surface that does not obtain in any other kind of cavity formation for this class of fillings. Another objection might seem to rise in the apparently unprotected labial plate of enamel The labial plate is always left standing for appearance even when the lingual plate must be cut away for strength, and if not properly protected might prove an element of weakness. But by carefully beveling the enamel margin and building gold over the bevel, it is

so perfectly protected that in all my experience with this method I cannot recall a single instance where this wall has failed. The acute corner at the mesio-occlusal angle should be rounded slightly, and the same corner on the lingual plate should be cut freely away so that the outline of the filling is a gentle curve from the proximate to the occlusal surface.

This form of filling provides an adequate protection for the end of the tooth, and does away with what is ordinarily a vulnerable point in most fillings of this class when constructed in the usual way, viz., the junction between gold and enamel at the occlusal surface. The slightest chipping away of the enamel at this point is often disastrous, and results in final destruction of the filling. Again, there is opportunity for deeper and firmer anchorage, without danger of approaching the pulp, than where an undercut is drilled into the axial wall. The cavity is rendered free of access for the insertion of the filling, and while more gold is used, it is more readily inserted and is hidden from anterior view by the labial plate of enamel. A filling of this form therefore looks no more conspicuous in front than where the occlusal surface is left intact. There are, of course, many cases of contour filling in incisors where this method is not applicable, such for instance as a pulpless tooth where the decay is deep, or where the dentine is badly involved and the lingual wall gone for some distance toward the neck. These are the cases, however, where anchorage in other ways is easily obtained.

"COMMERCIAL ELECTRICITY AND THE APPLICATION IN DENTAL PRACTICE," by L. E. Custer, B. S., D. D. S., Dayton, O.; read before the same society. The ever-increasing field for the application of the various forms of electricity in dental practice makes it necessary that the dentist should become familiar with the common electrical terms and the different commercial currents in general use.

There are three terms which are the foundation for electrical calculations, the volt, ampere and Watt. The *volt* is the term for pressure, and we speak of it just the same as we do of water in a pipe at so many pounds pressure. The *ampere* is the term for quantity, and to use the same illustration, the ampere represents the carrying capacity of the pipes or cross section of the stream

of water flowing. The *Watt* is the product of the volts multiplied by the amperes; that is, the quantity of water which flows through the pipe is equal to the size of the opening multipled by the water pressure. In other words, the Watt is the unit of electric power, and 746 Watts are equal to one horse power. It does not matter how the Watts are made up, whether more of volts or of amperes so long as the product of the pressure (volts) multiplied by the quantity (amperes) is equal to 746, it is one horse power. A current of 75 amperes flowing under a pressure of 10 volts will do work equal to about one horse power, or a current of one ampere at 746 volts will produce one horse power. A 16 c. p. lamp consumes 55 Watts, at 110 volts that would be half an ampere each, and 13 such burning at one time represents an expenditure of one horse power. Or a current of 10 amperes at 110 volts is equal to 1,100 Watts, or one and one-half horse power.

There are five different currents in common use. The arc light current, the 500 volt or car current, the 220 volt or power current, the 110 volt constant or Edison current, and the 52 volt alternating or Westinghouse current. The arc current is familiar to all, and it affords an interesting example in electric arithmetic. It requires a pressure of 45 volts to leap across the distance between the two carbons of the lamp to give the light we see, but to give a steady light there should be 10 amperes of current. These 10 amperes of current are started out from the power house, and for every arc lamp through which they pass there is required an addition of 45 volts. That is, a pressure of 45 volts is required to jump the arc and maintain it in the first lamp. This lamp must be kept burning, and when the second lamp is reached the dynamo quickly makes an additional 45 volts, and so on all the way around the circuit back to the power house. So that, if there are 50 arc lamps in the circuit there would be required 50 times 45 or 2250 volts to send a current of 10 amperes through the 50 lamps. The high voltage of the arc current is the cause of the danger. It is volts that kill. The 500 volt current is used mostly for street cars and heavy power work. The high voltage is used here for the same reason that it is more economical to carry water in small pipes at high pressure than in large pipes at low pressure, as well as the fact that the motors are better proportioned for their work when operated by this current. It will

be noticed that these cars are always lighted by five 110 volt lamps in series; that is, it requires 110 volts to properly burn one lamp, but with 500 volts pressure the current can go through one and then another till it has passed through five lamps, and each one will burn but little below its intended capacity. If four lamps were used they would soon burn out, because there would be 125 volts to a lamp instead of 110. The 220 volt current is mostly used for power purposes, because it can be carried on a rather small wire and is not especially dangerous to life. This current is not, however, very common. The Edison or 110 volt current is, as you well know, almost universally used for incandescent lighting and light power. This current does not differ from any of the preceding except as to voltage. It is sometimes called the constant current because the current is continually flowing in one direction. The pressure is set at 110 volts because it is found to be economically distributed at this voltage to that point where the voltage drops below 100. For this reason it is always used in small plants, or in large plants whose wires do not run far from the power house, in thickly settled centers, and in hotels and public buildings. The fifty-two volts of alternating current is used for incandescent lighting and light power also. This differs from the preceding in many ways. Instead of its flowing in one direction it flows alternately in one direction and then in the other. This current is distributed in an entirely different manner from the others. A current of very high voltage is conducted to what is known as the transformer, passing through which it induces an extra current in an entirely independent coil of wires and this new or induced current is the one carried into the house for use. So that the primary current of very high voltage is carried on a comparatively small wire for miles about the city at quite a small expense, and gives the consumer a light which would be impracticable with a constant current at that distance from the power station. This current is used mostly in small towns and in scattered suburbs.

Of the above mentioned currents the Edison or 110 volts constant potential current is the ideal one for dental purposes, and fortunately it is the most common of all. It is so easily made that nearly every office building operates its own plant. Or the dentist with a gasoline engine and dynamo can be independent at

a very small cost. The current is safe to life and its wiring is quite simple. It may be used for power, for light, for cataphoresis, for electrolysis and for heat equally as well. In fact, it seems as though this current was intended for dental purposes alone.

LEPROSY IN ICELAND.—Leprosy is increasing in Iceland in an alarming manner, according to the Jesuit missionary, Father Sveinsson. Last year a Danish physician, sent by the government, examined one-third of the island and found one hundred and forty-one lepers.

DANGERS OF COCAINE.—Dr. A. R. Baker, of Cleveland, Ohio, in a paper published in the American Journal of Ophthalmology, recapitulates the dangers of cocaine in a collection of ten fatal cases of poisoning by the drug. The smallest fatal dose where a measured quantity was given was two-thirds of a grain, which was injected into an eye, with the result that immediate unconsciousness was produced, followed by death in four hours. One grain injected into the gums by a dentist produced death in a few minutes. The application of a ten per cent. solution to the larynx with a brush was also fatal, unconsciousness following almost at once and death in three hours. The author also reports a case where the instillation of a six per cent. solution was followed by alarming depression, with periods of unconsciousness attended with delirium. —*D. & S. Microcosm.*

SMOKER'S VERTIGO.—At a recent meeting of the *Congres des societes savantes*, a report of which appeared in the *Progress Medical* for May 4, M. Kohos said that vertigo caused by nicotine was very frequently observed, and that it manifested itself sometimes under the form of a slight acute poisoning, accompanied with pallor, salivation, cold sweats, headache, vertigo, staggering, etc., which symptoms were produced in those who smoked for the first time; sometimes the poisoning was more serious, as, for instance, in the case of a man who had smoked twenty-five pipes on a wager, who suffered for many months with vertigo. The vertigo of chronic intoxication from tobacco, he said, might be observed in the workmen and work-women in tobacco factories, as well as in smokers, in snuff-takers, and in those who chewed tobacco. The action of nicotine varied according to the amount absorbed, and the disturbances caused in the life of the cells in consequence of their contact with the poison might also be variable.

M. Le Roy de Mericourt remarked that he had never observed smoker's vertigo in Britanny or in certain other countries in which he had lived for a long time, but he had observed a tendency to syncope dependent upon disturbances of the circulation following intoxication with the ordinary tobacco.—*New York Med. Journal.*

Letters.

WHO WOULD NOT TRY TO BENEFIT HIS PROFESSION?

HANCOCK, Mich., Nov. 4, 1895.

Dr. J. N. Crouse, Chicago,

DEAR SIR:—Your postal circular duly received, and for reply please accept a few questions from me.

Why has the sec'y. of the D. P. A. failed to fulfill some of his promises made so many times? *What* has the D. P. A. done or accomplished to retain the confidence and support of its members? *Where* are those certificates of membership that were to adorn our office walls to strike terror to the hearts of all patent agents when they came to bleed us? *Who* catches the most suckers, the D. P. A. or the patent men? *Why* do members of the D. P. A. never receive any reports of the doings of the Association without being compelled to pay for it by subscribing to the "DENTAL DIGEST?"

The above questions I believe voice the sentiments of the dental fraternity in this section of country who happen to have a part of their hard earned savings invested in the D. P. A.

Very truly yours, W. A. COURTNEY.

Dr. W. A. Courtney, Hancock, Mich.,

DEAR DOCTOR:—Your letter received, and I will endeavor to answer your questions. Your first is too indefinite to be answered. When you make accusations, either false or true, you should specify exactly to what you refer.

As to your second. The D. P. A. has stopped the annoyance from all patent claimants throughout this country. It has defended suits and driven these vampires from the many courts where they have brought suits. It has freed many of its members from notes given by them before the Ass'n. was organized in payment for royalties. These notes involved thousands of dollars—$14,000 in one state alone. So that the members have been entirely free from both money claims and from annoyance. It is now defending several suits, and if it were disbanded the patent claimants would soon come to life again. All this litigation

has been conducted with absolutely no trouble to the members, so that some men like you, who do not take much interest in their profession, imagine nothing has been accomplished.

In regard to your third. It is true that certificates were promised, but at the time it was not supposed that the canvassing by patentees would be so thoroughly stopped. I venture the proposition that you have not had a claimant for royalty in your office since you joined the Ass'n., so you did not need a certificate to prevent this annoyance. Especially as the issuing of them involved a large and unnecessary expense, and at one of its annual meetings the Ass'n. passed a resolution instructing me not to incur this expense.

Question four is too trifling and undignified to require much of an answer. Especially as it comes from a member, that is, one who has already been saved one hundred times the amount of his original investment.

Question five. If I were making a living by the work I do for the Ass'n., and could give all my time to it, I could scarcely do what you seem to think I should now do gratuitously, viz.—answer the thousands of letters from members who desire information. But as I have to practice dentistry for a living, and so can not give all my time to outside work, it is absolutely necessary for the Ass'n. to have an organ, and I have at my own risk, established the DIGEST as such, feeling sure that when the members appreciate its object, and see how much stronger we are with it than without it, they will all take the journal. Especially when they consider that it gives them more for their money than any other journal, besides saving the Ass'n. much expense in the sending out of circulars, notices, etc. In addition to all this the members should not forget that all this work has been done without any money compensation whatever, compelling me to give up all vacations, being a constant care, such as very few members have any idea of, and $20,000 would not pay me for the time spent. In view of all this, is it asking very much of the members to subscribe to the official organ of the Ass'n.?

I should imagine that your section of country is very small, since your state society, as well as all the prominent dental associations in this country passed resolutions commending the work and promising additional support. The members of the Protec-

tive Ass'n., excepting a few like yourself, appreciate the work done and yet to be accomplished. Yours truly, J. N. CROUSE.

STATE BOARD DENTAL EXAMINERS.

OFFICE OF THE SECRETARY. CHEROKEE, Iowa, Oct. 28, 1895.

J. N. Crouse, D. D. S., Chicago, Ill.,

MY DEAR DOCTOR:—Have received several cards regarding the "DIGEST," asking questions, and telling of the labor necessary to publish same. To be sure I am a member of this association and have always paid whatever or whenever asked, paid my membership fee same as others did, and can see no reason why I should subscribe for the DIGEST unless so disposed; and don't know what this journal is doing any more than others, and it is not because I did not read the copies sent me, for I read them very closely. Your "Supply Company" was going to do great things in the way of putting down prices. What have you done? Not a thing in this direction; we can buy just as cheap of anyone else as of the Supply Co., and get just as good for our money.

This is surely a matter of business, and your method of advertising among dentists may meet the approval of a majority of the profession, but this manner of advertising never struck me very forcibly, any more than for insurance or building and loan companies to use the name "Masonic" to do business with the public.

Should I need anything from your "Supply Company," or wish to take the "DIGEST," will make it known without your sending your "Monthly" card.

How about the "Certificates" of membership which you have been going to issue for the last five years to the membership of the "Association?"

Yours truly, F. P. WEBBER.

Dr. F. P. Webber, Cherokee, Iowa,

DEAR DOCTOR:—Your letter received and I will reply briefly to your propositions. Your remarks about the DIGEST and the membership certificates are answered in reply to the letter preceeding yours.

As a member of the Protective Ass'n. you have paid whatever you have been asked, which was the membership fee of $10, paid

about six years ago, and no annual dues since. You saw a reason then why you should join, and I presume I state the facts when I say that you did it because you were afraid of getting into patent litigation or else be compelled to take out a license and pay royalty. You will probably admit that you made a good investment, as you have been saved $100 a year since you joined. You might have done as others have done and are doing, viz.—let someone else pay for your protection, but if a sufficient number had not banded together, the expense of litigation would have been thrown on each dentist individually and would have eventually compelled them all to take licenses. While you deserve credit for becoming a member, in your refusal to help on with the work you give proof that you joined from no desire to benefit your profession, but simply to better your own condition.

As to your statements concerning the Supply Co., before the depot is opened I have demonstrated the strength of the movement by bringing about a reduction of three cents on the price of each tooth; a cut in the price of engines; a reduction in the price of gold; and the best bur made can now be procured for almost a fourth less a gross than any other good bur. The movement would have progressed much more rapidly if the members of the Protective Ass'n. had co-operated in a scheme which was formulated solely for their benefit. Because of this lack of general co-operation, I, with the help of some who had confidence in the plan and in me, assumed the responsibility, and for some time have been offering a reduction on goods to all members, not because I felt I was under any obligation to do so, but to induce others to join, thereby increasing our strength and bond of union.

It would be beneath my dignity to answer your accusations and disapproval of my "manner of advertising," were it not for the fact that the enemies of this reform movement, who have been trying to hinder it in every way they could for the last two years, have been throwing out false and dishonest accusations. You may have gotten your information from this source, but such an accusation without evidence would indicate a mind corrupted by conduct and thought, more especially as you use the official paper of the Board of which you are a member for your private correspondence, I presume to carry weight and overawe me.

Yours truly, J. N. CROUSE.

NEW YORK LETTER.

NEW YORK, Nov. 8, 1895.

To the Editor of the Digest,

MR. EDITOR:—How men do hear with their elbows—"Give us not only listening ears, but understanding also." This is so apparent in our discussions. Note the talk that followed the paper of Dr. Brown on perforating deciduous teeth, pulpless or otherwise. Dr. Brown is sound; practice will give good results so far as it concerns pulpless deciduous teeth, and we are quite as sure regarding pulpitis. Note one point—perforating the tooth by approaching it by a crosswise pressure at least prevents the largest percentage of vibration. Can a novice fail to see the wisdom of such practice? The idea impresses itself on one's mind. We have often made this operation and secured immediate relief, both in pulpitis and incipient abscesses. There is hardly anything which so taxes our nerves as these acute cases of pulpitis, and many times we are compelled to operate without the aid of an anæsthetic, save a local one, because of fear or prejudice. We are most heartily in accord with Dr. Brown's introduction of a very conservative method of dealing with teeth under circumstances that will often favor the treatment. How the character of the discussion that followed his paper emphasizes the importance of "face to face" dealings in teaching in our schools by one who can deal with a prod-stick thirty-six inches long.

The proceedings of the New York State Association for '95, aside from the reports of Dr. Ottolengui and Rhein, give but little that enlists the progressive man's interest. But all professional men are interested in that part of the report which refers to advertising, a much-hackneyed subject. It is suggestive, to say the least, (if not hypnotic). It so fully brings out the peculiarities of men's clandestine methods. The report could have gone further and brought out various methods of giving notice through the daily press, both in print and pictures. Well, it will continue for some time in spite of the debate. We noticed a disposition on the part of an advertiser to fire at the report; it was funny, how a hit bird flutters. Dr. Rhein's report we regard as very one-sided so far as it emphasizes the extreme gold work in the restoration of contour. It is only excellence that is emphasized by such examples as Atkinson, Varney and Webb. Too much

has been accomplished during the past ten years in the line of conservative practice to let it go by unnoticed. The truly professional practitioner is the one who seeks his patients' best interests with the least expenditure of time, energy and money. All kinds of teeth in all conditions of bodies must and can be best conserved by the various methods in vogue, all of which are invaluable in their place, judgment always being the dictator.

Only a slight tremor was caused by an emphasized announcement of the death of a lady in a New York dentist's chair from nitrous-oxide gas. An autopsy revealed no signs of organic weakness, but there is to follow an "inquest." We wish the public could have a snap-photograph of one of these shameful farces that so often occur in this great city. We witnessed one in '69, that was enough. Yet this anæsthetic has its place.

Among the irregularities of mankind we have omitted one thing which seemed to be italicized in Dr. Rhein's report, viz.—that "Stomatologists" are the men that the public can look to for the ability to meet the demands of the various diseases of the mouth and teeth. Does he mean the present enrolled membership, or is it to be understood that this is to be the ultimate outcome of Stomatology? Alas! there are many great problems before us. In the meantime we are confronted by the fact that there is no safety in leaning upon our own understanding.

Dr. Petersen, who holds various positions in the hospitals of New York, gave a learned paper on "Deformities of the Hard Palate in Degenerates" before the opening meeting of the Odontological Society. It was well attended. Prof. Peirce, always welcome in New York meetings, took part in the discussion, ably of course. Several prominent physicians were in attendance and forced the discussions by their culture and decided familiarity with broad subjects. Some of them were the governors of the Academy of Medicine, and fine-looking men they were. A broad and liberal education does tell and it does embellish a dental meeting. We are aware that there is a decided feeling that our teaching in societies should come more definitely from dentists than from medical men, and there is much to be said in favor of it, but after all, we do receive help by a large and liberal mixing. These medical gentlemen paid a deserved compliment, we think, to the character of the society gatherings of dentists in the

Academy, believing them to be an auxiliary to the larger teaching of medicine. The more we hold this view, the more we will fraternize in all that adds to the amelioration of human suffering.

Dr. Ottolengui, Dr. Kingsley's associate, gave an additional interest to this meeting by the exhibition of a large number of skilfully prepared models of cleft palates and the fixtures adapted to the deformities. They were studied with great interest by all as they were passed around. Skill tells its own story whenever it is on exhibition. It is always an object lesson which stirs the ambition to higher attainments.

Dr. St. George Elliot, of Japan, London, Washington, D. C., and now of New York, is gladly welcomed by all who have his acquaintance. He has always been a liberal contributor of matters of interest in our society gatherings. He tells us that he educated the first Japanese dentist in Japan, and that he was offered a position as teacher of dentistry by the Government, but his practice was more valuable to him.

There are chunks of wisdom in the leaders of the DIGEST, but few have a stomach that can or will assimilate them; too many are on the short cut.

Great expectations from Atlanta. We are not so sure that there will be a large delegation from these parts, yet the trip would be full of enjoyable profit. They know how to deal out something that most of us enjoy—true, genial hospitality.

We are just in possession of information concerning something that is to stir the scientific dental world decidedly. One of our journals will soon publish a paper that will set many ears itching that have perhaps ceased to listen; thinking that all the evidence has been handed in. The fact that this stir is to emanate from an unexpected quarter is all the more assurance that it will make the coming months in society matters brisk at least. We are a little chary of emphasizing our knowledge of coming events too emphatically, lest so much energy will be expended in curiosity that the mental powers will not be strong enough for the chip which must be displaced. This piece of news is not hearsay, but facts from the direct source. We take great pleasure in giving this intimation of a scientific challenge to the DIGEST, for although it is the last venture in journalism, it does not appear the least.

Cordially, M. A. G.

The Dental Digest.

PUBLISHED THE

TWENTIETH DAY OF EVERY MONTH.

Editorial.

WHAT WE WANT.

The time has come when the membership of the Protective Association must be increased if the organization is to be permanent, and this can easily be done if the members will give their help and co-operation. We have prepared lists of all the members in each state, which will be sent to every member within a few days, so that each one can see who has already joined in his state. We trust we shall have the help of the members in doing what should have been accomplished long ago, viz.—the getting of every practitioner of any account into the organization. The details of this plan will be given in a circular letter with the lists. To be brief, we want the membership of the Association greatly increased, the subscription list of the DIGEST doubled, and the remaining stock (one-fourth) of the Supply Co. taken *by dentists*, and all before Jan. 1st, 1896. What has already been done simply demonstrates what can be done if all the members of the profession will pull together. Who will respond?

WHO WOULD NOT TRY TO BENEFIT HIS PROFESSION?

Under this caption we publish two letters of adverse criticism, and would not spend any time in answering them were it not to show the need of improving the standing of the profession in more ways than one.

The letters are from dentists who joined the Protective Association, and we think it safe to say, judging from the tone of their remarks, that they joined entirely from selfish motives, fearing lest some one of the patent claimants would make them pay a license fee. For if they had public spirit enough to spend ten dollars for the good of their profession they would not make such insinuations and ask such questions.

These persons have received absolute protection for the last seven years, in which time, but for the Association, they would each have paid out at least $1,000 in license fees, that is, if they come under the head of active practitioners. We make this estimate unreservedly, as we know of cases where licensees of the Crown Co. in a single office, who continued to pay royalty, have paid $6,000, and no one can tell how many other patentees would have been claiming revenue from the dentists if the profession had not banded together.

Had the money been lost in an attempt at protection which failed to protect, we can see how many would have been dissatisfied and made complaints, but, in view of the fact that the Association has accomplished everything that could possibly have been asked of it as regards immunity from patent claimants of every description, such letters are unwarranted. Or if such criticisms came from the enemies of the profession, that is, those who have been robbing and annoying the dentists in every possible manner, and who saw in these reform movements elements which must eventually compel them to give us fair treatment, we could readily understand and show the motives; but how those who have received all the benefits afforded by the organization can show such an utter lack of appreciation, is beyond our comprehension.

We publish the letters and our replies with a hope of giving the members of the Association better information as to its real work, thinking that perhaps these complaints may have arisen from lack of information. We ask our readers to peruse carefully the replies and questions asked, and then to tell us whether it is not true that at least part of the profession require something more than protection to make them fit subjects for the next world, or even to be classed among men of a liberal and honorable profession in this one.

Notices.

INTER-STATE DENTAL MEETING.

A meeting of the General Executive Committee of the Inter-State Dental Meeting was held in Kansas City, at which each of the four states (Iowa, Nebraska, Kansas, and Missouri) was represented, and the following action taken. The place and time of meeting were fixed at Excelsior Springs, Mo., June 23-26, 1896. Dr. Henry J. McKellops was chosen Supervisor of Clinics, to be assisted by Dr. L. K. Fullerton, Iowa; Dr. D. M. Huestis, Neb.; Dr. C. B. Reed, Kan.; and Dr. H. S. Lowery, Mo.

Much enthusiasm was reported from all the states, and it is believed that this will be one of the greatest dental meetings ever held in the West.

S. C. A. RUBEY, Sec. J. P. ROOT, Chairman.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

The thirteenth annual session of the National Association of Dental Examiners was held at Asbury Park, N. J., commencing Monday, August 5, 1895; the president, Dr. L. Ashley Faught, of Philadelphia, in the chair.

The following state boards were represented at the sessions:

Alabama, T. P. Whitby; Delaware, C. R. Jefferis, D. M. Hitch; Georgia, J. H. Coyle; Iowa, J. T. Abbott; Kentucky, H. B. Tileston; Kansas, J. O. Houx; Colorado, R. B. Weiser; New Jersey, F. C. Barlow, Chas. A. Meeker, Geo. E. Adams, E. M. Beesley; Pennsylvania, Louis Jack, W. E. Magill, L. Ashley Faught, Jesse C. Green; Tennessee, F. A. Shotwell; Virginia, J. Hall Moore; District of Columbia, H. B. Noble, Williams Donnally.

The following boards were elected to membership:

Connecticut, Geo. L. Parmele; New York, Wm. Carr; New Hampshire, Edward B. Davis.

A resolution, offered by Dr. Barlow, requiring credentials to the association to bear the official seal of the state board making the application, was adopted.

A resolution offered by Dr. Donnally last year, and laid over, permitting persons who have been delegates to the association to be associate members without the right to vote or hold office, was taken up and adopted.

Dr. Jack offered the following, which was adopted:

Resolved, That this body would express to the Association of Faculties the importance of an examination of the equipment, methods, and facilities of instruction of the dental colleges of this country; it being understood that such examination is to be purely in the interest of higher educational standards and towards an approach to ultimate uniformity in the curriculum and methods of the schools, and more particularly to enable safe action to be made with respect to new schools.

Later a communication was received from the secretary of the National Association of Dental Faculties to the effect that the association had ordered the

secretary to secure information from the various colleges regarding their equipment and general facilities for teaching; that this information would be systematized so as to be available at the next annual meeting of this body.

The following "plan of requirements for the recognition of dental schools," offered by Dr. Jack, was adopted, with a proviso that it shall apply only to colleges making application after the close of this session:

That each dental school which may in future come before this board for recognition, must have a teaching faculty composed as follows, to wit: at least three professors of dental subjects, namely, for operative dentistry, for dental prosthetics, for dental pathology and therapeutics. For the medical subjects there must be at least five professors, namely, for anatomy, for physiology, for chemistry, for pathology, and for materia medica.

Its students must also be taught the subjects of chemistry and bacteriology in laboratories adapted to the purpose and under suitable instructors.

That such special school must possess, in addition to suitable lecture-rooms, a well-appointed dental infirmary and a general prosthetic laboratory; also each school must be provided with a room or rooms suitable for manual training in operative dentistry, and must furnish in this way systematic instruction to its students.

All of these provisions are to be determined by careful inspection on the part of the Board of Examiners of the state within which is located the school, or other authorized body duly indorsed by this association. And upon the result of this examination may depend the question of reputability.

The following colleges were added to the list of recognized schools: Dental Department of the University of Denver, Denver, Col.; Department of Dentistry of Detroit College of Medicine, Detroit, Mich.; Dental Department of Western Reserve University, Cleveland, Ohio.

Applications from the following were laid over one year: University of Buffalo, Dental Department; Atlanta Dental College; University College of Medicine, Dental Department, Richmond, Va.; Birmingham Dental College; Cincinnati College of Dental Surgery.

The Committee on Colleges in its report, which was presented by its chairman, Dr. Jack, expressed the view that more should be required to establish the right of dental schools to recognition by this body than good organization and the fulfillment of the rules of the Association of Faculties. Evidence should be furnished that the teachers are of high standing; that they require of their matriculates the stipulated preliminary training, and that they are carefully qualifying their students in every necessary direction. To ascertain these facts is a matter of difficulty. It is necessary, too, in addition to an ascertainment of the character of the faculties of any school, to discover the degree of confidence which has been developed in the minds of the local members of the profession.

The number of students in actual attendance in all the schools of the country for the session of 1894-95, excluding those attending special courses, was 4,979, as against 3,997 at the previous session; graduates, 1,208, as against 911.

The committee also expressed the conviction that it is becoming evident that the dental schools are increasing in number beyond the needs of

the public, owing to the tendency of medical schools to inaugurate dental departments. The installation of dental departments in connection with medical schools is necessarily often incomplete, and therefore the committee believes that restrictions should be placed upon the rapid increase of inefficient dental colleges. As the practice of dentistry is largely based upon knowledge of chemistry and bacteriology, and as manual training has become an integral part of the curriculum of some of the better schools, we recommend that the association do not in future recognize any school unless satisfactory evidence is furnished that the students of such schools applying for recognition are being taught in modern chemical and bacteriolgoical laboratories, and are also furnished with every convenience for manual training in prosthetic and operative dentistry, and that this latter mode of practical instruction is systematically carried on in at least the first year's course.

The committee also called attention to the importance of a higher standard of preliminary education, and to the impropriety of schools advertising as instructors practitioners who occasionally clinic before the students, but are not a part of the staff of the institution.

The report was adopted.

The following resolution, offered by Dr. Magill, was unanimously adopted:

Resolved, That we will not in future consider favorably an application for recognition from any college which has as a member of its faculty one who also holds membership in the State Examining Board.

Dr. Donnally moved that final action shall not be taken on the application of any college until such application has been in the hands of the chairman of the Committee on Colleges for at least ten months. So ordered.

The following were elected officers for the ensuing year: J. T. Abbott Manchester, Iowa, president; H. B. Noble, Washington, D. C., vice-president; Charles A. Meeker, Newark, N. J., secretary and treasurer.

Adjourned.

BLACK EYE.—To prevent black eye (*Maryland Medical Journal*), paint over the injured surface two or three times with a mixture of tincture of capsicum annuum and an equal bulk of mucilage and a few drops of glycerine. The coats should be repeated as soon as dry.

Obituary.

Noyes—Mrs. Fanny H. Wells Noyes, wife of Dr. Edmund Noyes, 1211 Judson Ave., Evanston, Ill., Oct. 20, 1895.

DR. W. H. SEDGWICK.

W. H. Sedgwick, D. D. S., died at his home in Granville, O., Oct. 24, 1895, from disease of the kidneys, from which he had suffered for several years.

He was born in Rockhill, O., Aug. 6, 1833, and at the age of fourteen moved to Zanesville where, one year later, he entered the dental office of his father. From this time he practiced his profession continually until his death. Early in life he united with the First Baptist Church of Zanesville, which was founded by his grandfather, the Rev. George C. Sedgwick. Of this church he was an active member until his removal from Zanesville in 1855. In Granville, his adopted home, he was married to Sarah E. Granger, Sept. 27, 1855. In 1869 he was graduated from the Dental College of Cincinnati, of which he was one of the founders, being a trustee at the time of his demise. So scholarly and skillful was he in theoretical and operative dentistry that he held the position of censor on the examining board of the Dental Department of the Ohio Medical College, and was president of the Ohio Dental Association in 1891–2. His contributions to dental journals were numerous, and through this medium his name was well known. He was one of six appointed by the Dental Association of Ohio to represent it at the International Medical Congress held in Washington, D. C., in 1887.

Deceased stood high in Masonic circles, being an active and honored Past Master and District Lecturer of the Grand Lodge of Ohio. He was also a member of the Knights of Pythias and Order of Eastern Star. These three lodges are now draped in mourning, memorial of a true, stanch, and useful brother.

A wife, two daughters, one son, two sisters and a brother survive him. To these his death is a grievous loss, especially since the family relations were so tender and affectionate. For their suffering the entire community feels a deep sympathy and joins them in regret over the death of a kind father and husband, a worthy citizen, a faithful friend, and a resident loyal to the best interests of his section.

DR. JAMES E. GARRETSON.

James Edmund Garretson, A. M., M. D., D. D. S., Dean of the Philadelphia College of Dental Surgery, died of enteritis, at his home in Lansdowne, Pa., Oct. 27, 1895.

Dr. Garretson was born in Wilmington, Del., Oct. 18, 1828, and commenced the study of dentistry with Dr. Thacher, of Wilmington, in 1850. He began practice near Woodbury, N. J., and later came to Philadelphia, where he entered as a student in the Philadelphia College of Dental Surgery, the progenitor of the present Pennsylvania College of Dental Surgery. He received his degree in dentistry on Feb. 29, 1856, and entered upon the practice of his profession in Philadelphia. He began the study of medicine at the University of Pennsylvania, graduating from there in 1859. The same year he was married to a daughter of George Craft, of Upper Greenwich, N. J. At the organization of the Philadelphia Dental College in 1862, Dr. Garretson became a member of the faculty as professor of pathology and therapeutics, but before delivering his course of lectures he resigned to accept the position made vacant by resignation of the late Prof. D. Hayes Agnew in the Philadelphia

School of Anatomy. He continued in charge of the school until 1864, when he gave up that position and entered the Philadelphia Dental College as professor of anatomy and surgery. During the war of the rebellion Dr. Garretson was for a time in active military hospital service. In 1869 he was appointed oral surgeon to the hospital of the University of Pennsylvania. In 1880 he became dean of the Philadelphia Dental College, which position he faithfully and acceptably filled until his death.

In the special field of his activities Dr. Garretson filled a unique place. He was the pioneer in a new department of surgery, viz.—oral, and the creator of its technique. He brought to the practice of his life-work the skill and manual dexterity of the trained dentist, to which was added the broad culture and intimate knowledge of his subject required by the educated surgeon. The history of his surgical work has yet to be written, but whoever prepares it will do injustice to Dr. Garretson if he fails to describe his kindness, tenderness, and ever-abiding sympathy with suffering, as well as the courage that enabled him to perform the most terrible operations with a skill not exceeded anywhere. With this educational equipment grafted upon his rich natural endowment of attractive characteristics, a combination resulted which easily accounts for his phenomenal success and wide reputation as a surgeon and as a teacher.

Broadly speaking, Dr. Garretson may be said to be a striking example of the self-made man. His love for his work, his faith in and respect for the possibilities of development in dentistry, and his ambition to secure for it the status and recognition it deserved, have borne abundant fruit in the example of success which he has left as a heritage to his profession.

The permanent record of his surgical work is embodied in his greatest literary work, the "System of Oral Surgery." This book has passed through six editions, the first appearing in 1869 and the last in 1895. Dr. Garretson was a contributor not only to the literature of his profession, but to general literature as well. His writings consisted of a number of separate book publications, as well as of contributions to periodical literature. Apart from his "System of Oral Surgery," he published works as follows: "Brushland," "Hours with John Darby," "Thinking and Thinkers," "Odd Hours of a Physician," "Nineteenth Century Sense," and "Man and His World." These were written under the *nom de plume* of "John Darby."

Dr. Garretson's love of the philosophy of all ages was deep and profound. His lectures on philosophical subjects, delivered at the College, will be remembered by those who heard them in their entirety, as containing some of the deepest thoughts conveyed in a most entertaining manner and with the least possible attempt at superiority.

He possessed to a marked degree attributes of simplicity and guilelessness. He had a childlike faith in the honesty of mankind; years never taught him even the shadow of a distrust or suspicion of his fellow-man, which might have spared him much of the care and anxiety which clouded his last days.

In response to a frequently expressed wish his body was cremated, and the ashes subsequently interred at the Friends' burying ground in Upper Darby—Dr. Garretson being a member of that faith. He leaves a widow and two daughters.

PRESCRIBE

LISTERINE

FOR PATIENTS WEARING

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Antiseptic and Prophylactic Wash

FOR THE MOUTH AND TEETH:

LISTERINE Is kept in stock by leading dealers in drugs everywhere, but in consequence of the prevalence of the SUBSTITUTION EVIL we earnestly request DENTAL PRACTITIONERS to

PRESCRIBE LISTERINE IN THE ORIGINAL PACKAGE.

LISTERINE is invaluable for the care and preservation of the teeth. It promptly destroys all odors emanating from diseased gums and teeth, and imparts to the mucous surfaces a sense of cleanliness and purification; used after eating acid fruit, etc., it restores the alkaline condition of the mouth necessary for the welfare of the teeth, and employed systematically it will retard decay and tend to keep the teeth and gums in a healthy state. LISTERINE is valuable for the purification of artificial dentures and for the treatment of all soreness of the oral cavity resulting from their use. Patients wearing bridge work should constantly employ a LISTERINE wash of agreeable strength.

LISTERINE is used in various degrees of dilution; one to two ounces of LISTERINE to a pint of water will be found sufficiently powerful for the general care of the deciduous teeth of children, whilst a solution composed of one part LISTERINE and three parts water will be found of agreeable and thoroughly efficient strength for employment upon the brush and as a daily wash for free use in the oral cavity, in the care and preservation of the permanent teeth.

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Patented Feb. 5, '95.

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The Dental Protective Supply Co.

A glance at the accompanying cuts illustrating this Hand piece will demonstrate the simplicity of its mechanism.

We have endeavored to design and place before the profession the most simple and durable Handpiece made.

The special features of the Handpiece are the double end chuck, the improved locking device, and long and efficient bearings.

Ample provision has been made for taking up all wear, and we guarantee that if the bearing surfaces are kept clean and well oiled, that this Handpiece will last for years, and prove the best that has ever been placed upon the market.

It is adapted to hold different forms of bit shanks (except cone journal) which can be inserted or taken out from the Handpiece while the engine is in motion; it is also designed so that it can be attached to any Dental Engine, and will fit all ordinary right angle attachments.

Owing to the entire absence of screws the Handpiece can be taken apart without the use of wrench or screw-driver, and is so constructed that escape of oil upon the hand of the operator,—an objectionable feature in some handpieces—is entirely avoided.

In ordering our No. 1 Handpiece, it is essential that you give all necessary particulars as to the style of your engine and attachments

PRICE - - - - $10.00.

—ORDER DIRECT FROM—

THE DENTAL PROTECTIVE SUPPLY CO.

CHICAGO, ILL.

"NO. 1" HANDPIECE.

DIRECTIONS FOR USE.

To Fasten Bit in Handpiece.

Push the sleeve H forward (which opens the split chuck) insert the Bit in spindle and draw back the sleeve H as far as it will go.

To Oil Handpiece.

Unscrew the milled nut A, (giving it about 4 turns), take out B, and then remove the sheath. Lubricate at back bearing L, and at coned portion of spindle for forward bearing and also on sliding collar C. Screw sheath back on collar replace B in its seat on H (being very careful to see that the small lug on B engages in the groove of C), and screw milled nut A back in place.

To Take Up Wear.

If the spindle becomes loose in its bearing a slight turn of the adjusting nut L (which has left hand thread) and jamb nut M will take up all wear.

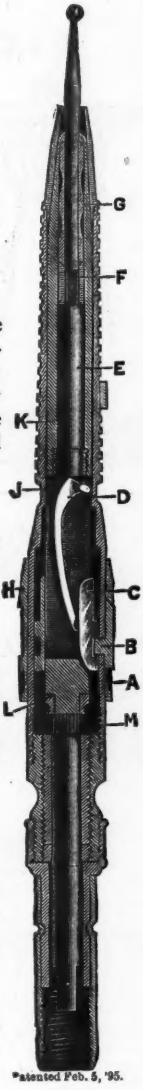
To Attach Handpiece to Any Cable Engine.

Unscrew the swivel on end of Handpiece which exposes the coupling, unscrew the latter from spindle, and solder cable in end with the two flats milled on.

Screw coupling back in place again tightly, to avoid unscrewing when running backward, attach swivel to flexible sheath and screw back in place.

Handpiece Repairs.

We would draw your special attention to the extra facilities which we possess for the efficient and prompt repairing of Handpieces. We have a staff of skillful workmen constantly engaged on this class of work, and Handpieces entrusted to us for repair will receive careful attention.



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THE DENTAL PROTECTIVE SUPPLY CO.

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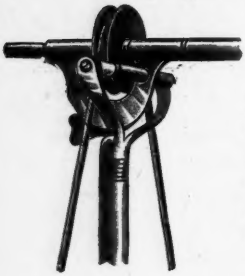
"No. 1" Engine

PRICES OF SEPARATE PARTS.



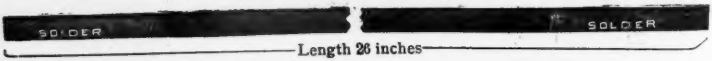
ENGINE PULLEY HEAD.

This cut of the enlarged details of the Pulley Head of our No. 1 Dental Engine, shows the thumb piece by which the arm can be lowered. It will be seen that the pulley wheel is *centred* on long bearings, thereby insuring steady running. This Pulley Head is made to fit the standards of the leading Dental Engines.

ENGINE SHEATH.

Length 22 inches

ENGINE CABLE.



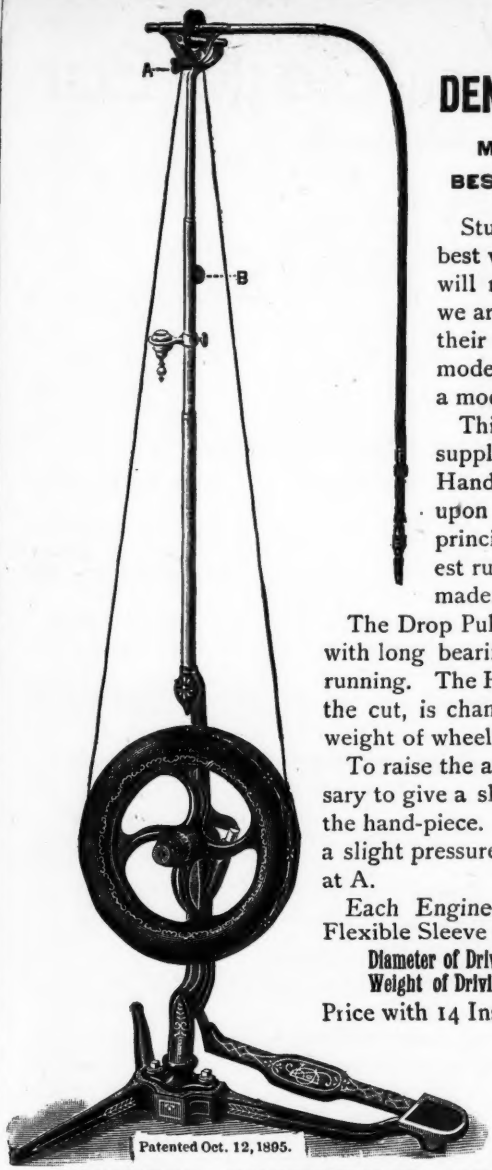
Length 26 inches

FLEXIBLE SPRING CONNECTION.

DRIVING SPRING.

PRICES.

Engine Base and Standard	$18.00
Pulley Head complete	$ 8.00
Sheath with nickel plated ferrules, complete	$ 1.50
Cable	$ 1.50
Flexible Spring Connection, complete	$ 2.25
Flexible Driving Spring	$ .10
Engine Driving Cord	$ .10
Water Cup	$ 1.50



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This Cable Arm Engine supplied with our No. 1 Handpiece is constructed upon correct mechanical principles, and is the easiest running Dental Engine made.

The Drop Pulley Head is supplied with long bearings, insuring steady running. The Hub, as will be seen in the cut, is chambered so as to *center* weight of wheel.

To raise the arm it is only necessary to give a slight upward toss to the hand-piece. To lower it requires a slight pressure on the thumb-piece at A.

Each Engine is supplied with a Flexible Sleeve and Water Cup.

Diameter of Driving Wheel, 12 inches.
Weight of Driving Wheel, 13 pounds.

Price with 14 Instruments and Oiler

$38

Boxing 75 cents extra.

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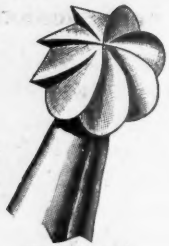
The "Dual-Blade" Bur

(SELF-CLEANSING.)



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EXAMINE THE BLADES!

These twin blades entirely traverse the cutting surface of the Bur. The blades are stone-cut and brought to a fine keen edge. These Burs will be found to clear themselves thoroughly when in use, enabling the operator to rapidly cut—not *grind*—Dentine, and prepare cavities with the least possible pain to the patient. This is what we make Burs for—**ADAPTABILITY TO CUT SENSITIVE DENTINE**—and that's what they are used for! We wont enlarge upon their capabilities for drilling steel or glass, though they will do so, but for cutting sensitive Dentine with the minimum of pain to the patient, our "Dual-Blade" Burs have no equal.

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Kept in Stock in the following shapes and sizes:

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UNIVERSAL AND RIGHT ANGLE BURS.

Sizes 0 to 7 Inclusive, $2.00 Per Doz.

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(Universal Burs Only) ..... **$2.75 Per Doz.**

QUANTITY PRICES.

Burs—Universal and Right Angle (doz. price, $2.00)....per half gross..$10.50
" " " " " (doz. price, $2.75) ...." " " .. 14.50

Send for sample dozen and enclose $2.00.

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PRICES.

		Per Dozen.	Per Spool.
PLAIN.....	12 yards spools,	$ .75	$ .08
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WAXED, in boxes, as per cut.	12 yards spools,	1.25	.12
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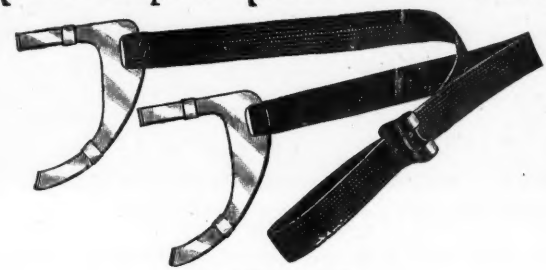

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PRICE, $1.25.

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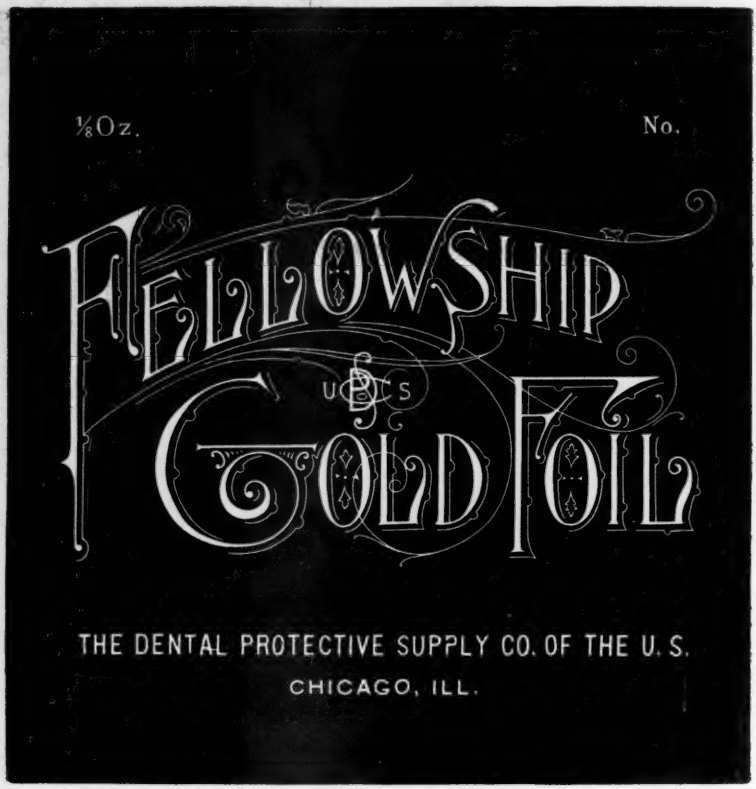

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Nos. 3, 4, 5, 6, 10, 20, 30, 40, 60.

Corrugated Foil, Soft and Semi-Cohesive, in above numbers.

Rolled Gold Foil, Extra Cohesive, FROM NO. 20 UPWARD.

Price, per ⅛ oz.	$ 4 00	
" " ¼ oz.	15 00	
" " oz.	29 00	per oz.
" 2 ozs. at one time	28 00	" "
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Plain.....—Nos.8 7 6 5 4 3 2 1 0
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PLAIN CYLINDERS, SOFT AND COHESIVE.
CORRUGATED CYLINDERS, SOFT AND COHESIVE.

Price, per	⅛ oz	$ 4.00
" "	½ oz	15.00
" "	oz	29.00
"	2 ozs. at one time	per oz. 28.00
"	5 ozs. " "	" 27.50

Each box of Plain Cylinders is labeled, showing the proportion of a sheet of Foil contained in each Cylinder as follows:

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In No. 8, 40 Cylinders,=1 Sheet of No. 4 Foil.
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In No. 2, each Cylinder contains ½ Sheet of No. 4 Foil.
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The Dental Protective Supply Co.

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"No. 1" ALLOY.

Put up in Shavings, and Medium and Fine Filings.

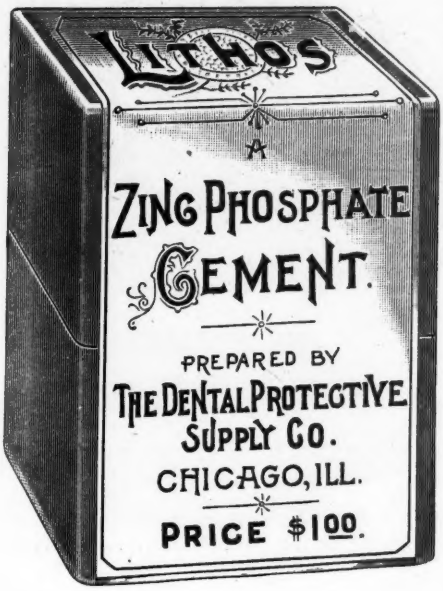
This alloy is made by a special process which ensures uniformity, and is the result of a series of scientific experiments.

It sets quite quickly, and should be placed in the cavity under even pressure, using spunk or bibulous paper between the alloy and the instrument.

We have never yet found an Alloy its equal for hardness, strength of edge, and entire absence of shrinkage.

PRICE, PER OZ. TROY, $2.50.

PRICE, PER 2 OZS., $4.50; 5 OZS., $10.00.



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Is non-conducting.

Non-irritating to the pulp.

It neither shrinks nor expands.

Gives no pain whatever to sensitive dentine.

Is thoroughly compatible with tooth-structure.

Possesses the desirable quality of easy mixing.

Retains plasticity sufficiently long for proper manipulation

FOR the attachment of crowns, gold caps and inlays, this Cement gives excellent results. It has a durability equal to the best cements on the market.

Price $1.00

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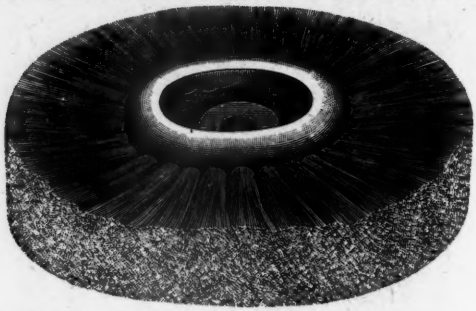
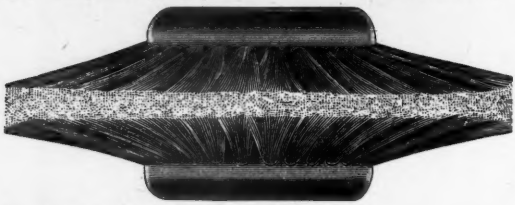


No. 26. Soft, size 2¾ in., price..... 34



No. 27. Converging, stiff, 3 in., price..... .44

No. 1. Tooth Brush Wheel,
Bone center, price .20

Tooth Polishing Brush,
Per doz. .30. Each .03.

No. 2 Tooth Brush Wheel,
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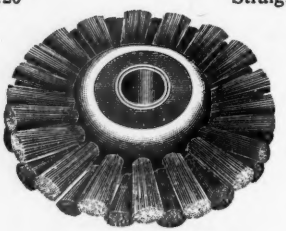
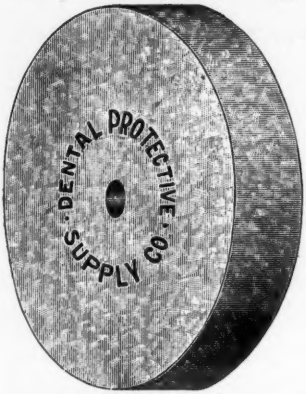


Steel Wire Bur Brush,
Size 1⅝ dia. Price .50

The above cuts represent samples of the Brushes we keep in stock—various other sizes can be supplied on application.

DENTAL PROTECTIVE SUPPLY CO.
CHICAGO, ILL.

Felt Polishing Wheels and Cones



WHEELS.

1¾	in. by	⅜,	each	.15
2	" "	⅜,	"	.20
2¼	" "	½,	"	.25
2½	" "	⅝,	"	.25

CONES.

Large, 2 in. by 1 in., each .20
Small, 1⅝" " ¾ " " .10

BROACH HOLDERS.

Plain, Bone Handle.....each .10

RUBBER PLASTER BOWLS.

2¼ inches deep
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PRICE .40

3 inches deep.
diameter 4¼ inches.
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4 inches deep.
diameter 4⅞ inches.
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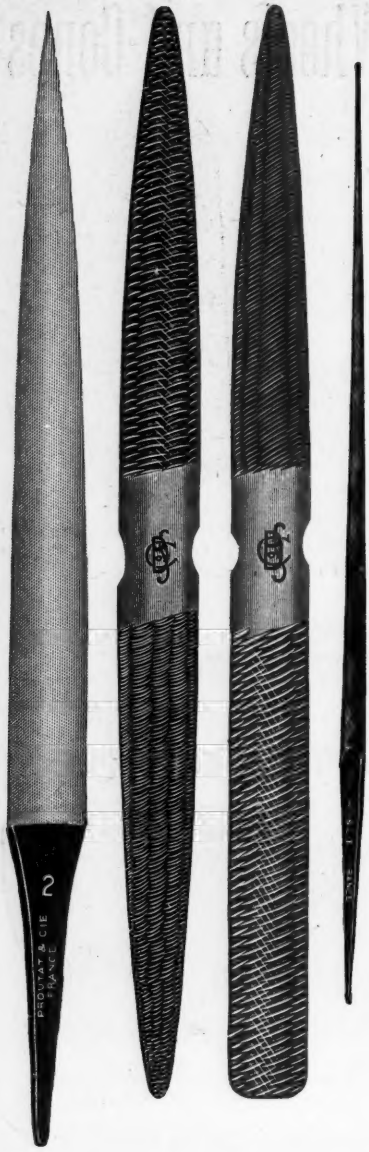
Made of strong pliable rubber $\frac{3}{16}$ inch thick.



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